The Builder.

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The Institute and its Critics.

WE print in another column two letters, from Mr. T. G. Jackson and Mr. Prior respectively, intended to sum up and enforce their views upon architecture and the grounds of their opposition to the Institute of Architects, as expressed at the last meeting of the Architectural Association. But we cannot print them without some comment, because both of them proceed to some extent on erroneous conceptions both of our own views and of what we take to be the position of the Institute of Architects.

In regard to one point in Mr. Jackson's letter, touching the question of the laying-out of estates, we may observe that we knew perfectly well, and in fact implied in our remarks, that he and his friends attached a great deal of importance to the intervention of the architect in the laying-out of estates. Mr. Jackson evades the real point of our remark, which was, that an architect who had surveyed an estate himself would know much more about the ground than one who merely took a survey made for him. Surveying in that sense is not of course the same thing as "valuing land, letting it on building leases, and floating building schemes," which, we cordially agree, have nothing to do with architecture; but it is one part of "surveying," and if Mr. Jackson thinks that it has nothing to do with architecture he at all events avoids saying so in his letter. Our contention is that it has as much to do with architecture as the examination of the nature of the foundations for a building has to do with architecture; the man who is either to lay out the estate or to build the house should be in the position of himself acquiring all the requisite practical knowledge of the ground; and to do that he must know something of what is properly called surveying. If architecture is to be called a pure art, the inspection of foundations, and the treatment of a bad foundation with concrete or otherwise, is not architecture, for it is certainly not art, but science pure and simple; but we do not think Mr. Jackson will venture to deny that it is a matter which must come within the architect's personal knowledge and supervision, unless he is to call in an engineer to certify that the foundations are fit for him to erect his design upon.

A minor point, in which our difference is rather perhaps in words than ideas, is in regard to the specification. All we meant to imply is that under the contract system the specification is rather a statement to the contractor than "a letter to the workmen," and that Mr. Jackson's phrase about "unnecessary verbiage" was liable to misinterpretation in a dangerous sense. A specification signed as part of a contract is practically, as we pointed out, a legal document. All legal documents contain what, in the sense of ordinary correspondence or conversation, would be called "unnecessary verbiage," intended to leave no loophole for disingenuous misinterpretation. A high-principled contractor would not attempt to take advantage of a loophole in wording, where the intended meaning was obvious; an unprincipled contractor might do so; *ergo*, a certain legal precision of language is on the safe side, and advice which seems to undervalue this may, if too hastily acted upon, lead a young architect into serious difficulties. Mr. Jackson in his letter has put the necessity for precision of language as strongly as possible; but the original words in his paper hardly conveyed the same impression.

In regard to the question as to the supposed recognition of Surveyors by the Institute we must point out that Mr. Jackson's letter does not correctly represent either our own views or the position of the Institute. Mr. Jackson refers to the surveyor-architect as "that hybrid personage of whom you think it unreasonable that we should want to get rid." Now, we not only did *not* say that, but we especially inserted a foot-note to the leading article of last week to explain exactly what we did say, viz., that it was unreasonable to expect that the Institute should expel a man who had been rightfully elected as an architect, because he subsequently engaged in surveying business. We will come to that point again just now. Meanwhile as to the Institute. Mr. Jackson repeats the assertion, which was contradicted at the Association meeting, that the Institute recognises this "hybrid personage." Formally and officially the Institute does nothing of the kind. We will quote from the definitions of classes of members in the Institute Charter; not the full wording, but sufficient for the purpose:—

"*Fellows* shall be Architects who have attained the age of thirty years and who have been engaged as principals for at least seven successive years in the practice of architecture. . . .

Associates shall be persons engaged in the study or practice of architecture who have attained the age of twenty-one years. . . .

Honorary Associates shall be persons not professionally engaged in practice as architects who by reason of their position or of their eminence in art science or literature or their experience in matters relating to architecture may appear to the Council to be able to render assistance in promoting the objects of the Royal Institute."

The Charter goes on to name the two other classes, viz. *Honorary Fellows*, who may be members of the Royal Family, persons who have held high office in the Government, or "other illustrious or distinguished persons to be selected as the Royal Institute may from time to time determine"; and *Honorary Corresponding Members*, who are persons, not British subjects, "who by reason of their eminence as architects or archæologists or for artistic scientific or literary acquirements may appear to the Council able to render assistance in promoting the objects of the Royal Institute."

Not a word about surveyors anywhere.

A surveyor might be among the Honorary Associates, but he would have to be elected for something more than mere surveying. Mr. Jackson, however, makes it his point that half the members of the Institute named in the "London Directory" are described as "architects and surveyors." It may be so, but that is not contemplated in the Institute Charter, and some of these may be surveyors merely in the sense already pointed out, in which surveying is really very closely connected with architecture. Some of them, on the other hand, we have no doubt are people who are quite out of place in an Institute of Architects properly so called, but we surmise that most of that class are not of recent election, and under the present much-abused

system of examination for entrance they probably could not have become members. But they cannot be turned out now by retrospective legislation. That is the expectation which we call "unreasonable"; and that is not the only class of cases. Take the case of a man who really has architectural ability and enthusiasm, but who has not been able, perhaps for want of connexion, to get a good income out of an art which he would be only too glad to practise exclusively, who has a wife and children to support, who finds some surveying practice come to him, and makes use of his practical knowledge to increase his income thereby. Is he to have the stigma put upon him of being turned out of the Institute of which he became a member, perhaps, with very different hopes? Let us see how it looks in black and white:—

"Sir,—I am directed by the President and Council of the Institute to inform you that it has been brought to their knowledge that you have been engaged in making a survey of the —— estate, and in preparing plans of it for the purposes of an intended sale.

Such a proceeding being entirely alien from the objects with which this Institute was founded, and in furtherance of which you were elected a member thereof, I am directed by the Council to inform you that your name has been removed from the list of members of the Institute of British Architects, from this date.

I beg to return you the amount of your subscription for the current year, and remain, Sir, your obedient servant, A——— B———.
Secretary.

T. Pinch, Esq."

That, in plain English, is what the demand of Mr. Jackson and his friends must mean, when put into practical working. Is that "reasonable?" Is it even Christian charity?

In regard to the question of the Institute examinations, we may call attention to the letter immediately following Mr. Jackson's on p. 488, from a student who has worked up for and passed the Institute examination. We know nothing of "Epictetus" beyond what he tells us in his letter, but nothing could be more to the point. He has found the Institute scheme of study tested by examination the very thing which he wanted to give direction and encouragement to his studies, and we venture to think that a good many more young men would say the same. His letter puts the case so well that we think further comment unnecessary, and content ourselves with drawing attention to it and leaving it to speak for itself.

We think it is to be regretted that Mr. Prior was not content with the general terms of his speech, instead of expressing himself in a more detailed manner in a letter which only serves to lay open more distinctly the weak points of his position. We admired Mr. Prior's speech at the Association, it was a manly and honest expression of enthusiasm, and without agreeing with all he said, we were certainly far more in sympathy with the tone of his remarks than with those of the speech to which he replied. We quite agreed with him that if the practice of architecture were to be no higher a matter than what Professor Kerr put it at, one might as well leave it alone. We have not an unkind word to say of Mr. Prior, but we think he is sadly illogical: and in the first place we must point out that he, like others, criticises the Institute for what they do *not* do or say. The President of the Institute did *not* say that the architect should have three faces, artistic, scientific, and professional, to turn to the public at all points. He said that the true architect combined all three capacities, that of artist, constructor, and man of business. Barry, whom we hold to have been the greatest English architect of modern days, was such an architect. Then Mr. Prior argues that if the Forth Bridge is the production of constructive science and the Mediæval cathedrals are not, surely it must be better for an architect to have no constructive science. Really it is almost impossible to answer such an argument gravely. As to the Forth Bridge, we may observe in passing that if any architect has no admiration or enthusiasm to find for that stupendous structure, one of the most remarkable achievements of human boldness and ingenuity in any age, we are sorry for him. But supposing the Forth Bridge as ugly as you please (which we cannot find it to be), is it therefore to be concluded that architects who neglect the science of construction will on that account be better able to produce architecture which will rival the Mediæval cathedrals? This is really one of the most extraordinary instances of a *non sequitur* in logic that we ever came across. The crossing of Peterborough was so villainously constructed that it has had to be taken down again, and when its mode of construction was seen the astonishment was that it had ever stood so long: the west front has been so badly founded that it is leaning away from the building, and will probably have to be rebuilt before long, lest it should fall down first. And are we actually to suppose that a better knowledge of or more care for construction would have injured and deadened the architectural genius of the builders of Peterborough? or does Mr. Prior think they are the more to be reverenced because they produced architecture which, however fine in effect, would not stand? Architects who promulgate such views are just playing into the hands of men like Lord Grimthorpe. Mr. Prior then tells us, to our astonishment, that the merit of engineers is that they "let their construction go unabashed in its scientific contortion." He must have paid very little attention to the subject, or he would have known that the very complaint made, for years back, against engineers, is that they are not content with that, and that they will try to plaster their construction with what they think is architecture (*vide* Blackfriars Bridge, as one of the most flagrant examples). The Forth Bridge is free from this charge, and in fact any attempt to treat such a structure as that in a decorative manner would have been a kind of impertinence. The construction must be taken for what it is: it could not have been done in any other way. But in general it is the modern engineer much more than the modern architect who puts an architectural "mask" to his construction. As to Mr. Prior's digging up again of the "Quarterly Reviewer" and his absurdities, which have been disposed of long ago, we can only think that people must be rather hard up for an argument when they begin to resuscitate such nonsense as that.

Apart from this kind of exaggeration we have a great deal of sympathy with the enthusiasm of those who wish to hold up what they think the highest view of architecture as an art, and a great deal of admiration for much of their work. But it is perfectly out of the question to suppose that the Institute of Architects, which was created "for the advancement of the art of architecture" (let us never forget that), and which has numbered among its active members such men as Barry, Cockerell, Donaldson, Scott, Street (not to mention the living) is to be expected to shut itself up, and to give up a long-considered scheme for the promotion of architectural study, because some talented men with very Utopian ideas think that there ought to be no such thing as an Institute of Architects, and attribute to its existence all sorts of evils which are mainly the creation of their own imagination. If the Institute is not doing all that such a body might do for "the advancement of the art of architecture," it is mainly because some of those who might give it the best help in that direction prefer, from a mistaken supersensitiveness, to stand aside and scoff at it because, like a good many other human institutions, it is not up to an ideal standard of perfection.

Water Supply of Norton, Yorks.—The question of a new and efficient water supply for Norton is, we are informed, about to be settled. Under the superintendence of Messrs. Fairbank & Son, of Westminster, Mr. Villiers, of Beverley, has been boring for water on the Howe Hill, near the Steeplechase course, for nearly a month, and at a depth of 60 ft. through the rock has struck what appears to be an abundant supply. The water is pure and clear, and much softer than the water from the Malton supply.

BATH MUNICIPAL BUILDINGS.

The City Council of Bath is to be congratulated on having appointed as architect for the new Municipal Buildings the gentleman who, beyond any other living architect, is most completely in sympathy with the peculiar phase of English Renaissance of which the existing Town Hall is an example.

This is a matter of some importance, as the existing building is to form the centre of the group of which the additions now about to be commenced are to form one wing, and a projected Art Gallery and Technical Schools the other.

The problem set before the competitors in the recent competition was not altogether an easy one, as the site, which is situated at the junction of High-street and Orange-grove, two streets which meet at an acute angle, furnishes by no means an abundant area for the accommodation required. The present building, to which the new additions are to form an adjunct, contains a large Town Hall on the first floor, and under it the present Sessions-court and the small offices connected therewith.

The additional accommodation required consists principally of a large Police-court, Council Chamber, and Municipal Offices, and one of the chief points, therefore, on which the competitors differ was as to the advisability of retaining the present Sessions-court, or of providing a fresh one in the new buildings, and utilising the site of the old for Municipal Offices.

Mr. Brydon, the author of the selected design, has adopted,—and we think wisely,—the simpler course of retaining the present Sessions-court, and arranging the new Police-court in close proximity to the old building. This he has done by placing the Police-court on the ground-floor at the rear of the High-street front, with the Council Chamber over, a position which has the great advantage of being quiet, and allowing of a ready disposition of the rooms for witnesses, barristers, and solicitors, so as to be convenient both for the new court and the old. In the general arrangement of his plan, Mr. Brydon has skilfully avoided the two opposite faults into one of which many of his competitors have fallen, of over-elaboration of halls and corridors on the one hand, and undignified and cramped arrangement on the other.

The principal entrance to the new building in the selected plan is at the angle of High-street and Orange-grove, of which the author has made a circular corner. Entering at the angle through a semicircular entrance-hall, we come to the Municipal staircase, sufficiently imposing, but not extravagant, and well-lighted, both from the sides by an open area and also from the top; radiating from this we have one corridor parallel to High-street and another at right-angles thereto, but not quite parallel to Orange-grove. The High-street corridor leads to the new Police-court and the offices belonging to it, and finally connects with the existing building by a cleverly-arranged approach. The Orange-grove corridor leads to the Barristers'-rooms, the City Engineer's offices, and public lavatories. Whereas many of the competitors have allowed their corridors to appear badly lighted, Mr. Brydon has skilfully arranged a cross light from the streets, and contrives to obtain good lighting to his corridors.

On the first floor Mr. Brydon places the Council Chamber over the new Police-court, while the committee-room and mayor's parlour face the High-street, so that the whole Council accommodation is compact and close together, and well approached both from the present staircase and from that of the new building. The Town Clerk's offices are arranged at the angle of High-street and Orange-grove, in close proximity, therefore, to the Council Chamber and the new Municipal staircase, while the Treasurer's Offices adjoin the Orange-grove frontage. It would probably be more convenient for the Treasurer's Offices to be placed on the ground floor, and those of the Engineer on the first

floor, thus reversing the position shown on the competition drawings.

In the basement the author of the selected design has placed the offices for Inspector of Weights and Measures, gas testing, Inspector of Nuisances, heating chamber, police waiting-room, with the convenient feature of an underground passage from the police offices, and six spare rooms, which it is suggested might be utilised for the City Surveyor. In no respect is the superiority of Mr. Brydon's plan over that of his competitors more marked than in his arrangement of the basement floor. The rooms are well lighted and well approached, so that the whole would be perfectly satisfactory for the use intended, while there is an entire absence of the impression given by the majority of the other designs that their authors have left the basement to take care of itself, and have given insufficient thought to its arrangement.

On the second floor Mr. Brydon shows five spare-rooms, the precise use of which is left for future requirements.

Turning to the elevations, we find that Mr. Brydon has more thoroughly caught the feeling of the old work than any other of his competitors, the majority of whom have lost touch with the spirit of the existing building by over-fenestration, whereas Mr. Brydon has observed that one of the most prominent points in the design of the existing Town Hall is the large amount of plain wall surface in its external elevation. Mr. Brydon suggests that a small, flat dome be added for the centre of the new building, which both preserves the importance of this part of the composition, and with the cupolas, which are shown to the new building, produces a pleasant sky-line.

At the circular angle over his chief entrance the author of the selected design shows a detached colonnade ranging with and repeating that of the existing Town Hall. The design of this circular corner is the only point in the exterior composition in which we are inclined to doubt Mr. Brydon's judgment. If the second floor over the circular part of the façade were omitted and the lines of that part of the building facing High-street were retained, the present building would retain greater importance. We have some doubt, too, as to the treatment of the band of sculpture between the first and second floor windows at this point; it is, we think, quite open to question wheeher the use of life-size figures of somewhat high relief, attached to the wall of a façade without any definite architectural framing, is a right and proper application of sculpture to architecture. This treatment, which appears to find favour with some of the architectural members of the Guild of Art Workers, is opposed to the experience and practice of any of the best schools of architectural sculpture of past ages, while there can be no doubt whatever that it is entirely contrary to the traditions of English Renaissance as seen in the buildings of Bath.

The authors of the second premiated design,—Messrs. Burgess & Oliver, of Gray's-inn,—have adopted an entirely different treatment in their plan to that proposed by Mr. Brydon; they have thought it better to alter the old Sessions-court into offices for the Treasurer, Inspector of Nuisances, and Local Officer of Health, and to provide two new Courts. The principal entrance in this design is from High-street, near the corner of Orange-grove. The authors have avoided the awkwardness of the acute-angled frontages by placing the building rectangularly to the High-street, filling up the redundant spaces by circular projections.

The Magistrates' Court is placed in a somewhat smaller position to that adopted by Mr. Brydon, and the Sessions Court next to the Orange-grove front. These are approached by wide corridors, but no internal hall of any dimensions is provided, and the principal staircase somewhat lacks dignity of treatment. One jury-room only is provided, and one witness-room, with inconvenient communication to the witness-box. The corridors are not so well lighted as might be desired, and the communication between the old building and the new is not well managed. On the first-floor the Council Chamber is arranged over the Magistrates' Court, but is larger in size than necessary, although the particulars issued to competitors suggest that this should be especially avoided. The Mayor's parlour, Town Clerk's offices, and committee-room are also arranged on the first-floor, while the Engineer's offices are placed on the second-floor, and the offices for the Inspector of Weights and Measures, and Surveyor, are arranged in the basement, which is fairly well lighted, but rather rambling in arrangement.

The elevations are well designed in themselves, but do not accord with the spirit of the old building so well as those of Mr. Brydon. A somewhat unfortunate idea is the repetition of the columns and pediment of the existing front at a lower level, while the symmetry of the whole composition,—a matter of considerable importance in keeping up the Bath traditions,—is spoilt by the entrance to the market which the authors suggest in the Art Gallery Wing.

The Third Premiated Design, by Mr. T. B. Silcock, of Bath, is one of the most elaborate in its internal arrangement, the important feature of which is the Grand Inner Hall, lit from the roof, and with galleries running round on the first floor. This, the author in his report says, "would be elaborately finished in various marbles, relieved with carving and richness of detail." A new grand staircase is also proposed in the old building, the design of which is quite foreign to the spirit of the existing work. The chief entrance in this design is at the angle of the two streets, and very spacious.

The Court is placed in the same position as in the selected plan, with the Council Chamber on the first floor over it. In other respects, the space devoted to the Grand Inner Hall, 40 ft. by 28 ft., leads to the cramping of the Municipal Offices, of which the Treasurer's are placed on the ground-floor, the Town Clerk's and City Engineer's on the first floor; the City Architect, School Board, and City Surveyor on the second floor; the Medical Officer, Inspector of Nuisances, Meter-testing, Inspector of Weights and Measures, and Gas-testing in the basement, which also contains strong-rooms for the City Treasurer, Surveyor and Engineer, and Town Clerk,—a somewhat inconvenient arrangement if it can be avoided. The corridors in this plan, both in the basement and on the upper floors, are in many cases badly lighted.

Externally the main part of the elevation retains the lines of the Town Hall, but is connected thereto by a lower portion, which is too short to permit a sufficient degree of importance to the existing building. The details err on the side of over-richness for the refined simplicity of the old work, so that altogether the new additions would overpower the existing work. Generally this design, though in many respects an able one, has overshot the mark imposed by the necessities of the problem, notably in the matter of cost, which would probably be nearer 30,000*l.* than the 22,500*l.* of the selected design.

In preparing his report, Mr. Wm. Young, the assessor, selected three other designs, besides those premiated, for special commendation. These were "Simplicity of Plan and Harmony of Elevation," by Messrs. Heathcote & Rawl, of Manchester; "Progress," by Messrs. Chorley & Connon, of Leeds; and "Guildhall," by Mr. Brightwen Binyon, of Ipswich.

Messrs. Heathcote & Rawl place their Police-court with the Council Chamber in the position adopted in the selected design, with the Treasurer's and City Engineer's offices on the ground floor, and the Town Clerk's on the first floor. The various rooms are well placed for their respective purposes, but the approaches thereto lack simplicity and directness, and many of the rooms are of bad shape, the difficulties of the site not being skilfully met. The external treatment harmonises well in elevation with the existing building, but the endeavour to avoid overpowering the old work has somewhat divested the new of dignity.

Messrs. Chorley & Connon have submitted a good straightforward plan, with well-lighted corridors and hall, but have sacrificed too much to these desiderata. The frontage next High-street is entirely given up to the corridor, so that the rooms for witnesses, barristers, and solicitors are on the Orange-grove side, and thus at an inconvenient distance from the old Sessions-court, which is retained. The perspective submitted has exactly caught the feeling of the architectural design of the exterior in its representation of bustling city life, more characteristic of a Northern town than of sedate and stately Bath, and herein lies the defect of the elevations,—they miss the quietness and repose so strongly marked in the dignified design of the existing building.

Mr. Brightwen Binyon's plan shows the Police-court at the angle of High-street and Orange-grove, with Council Chamber over it on the first floor, a position which would be exposed to the noise of the streets. The principal entrance is placed next the existing building, with a grand staircase and hall, and there is evidence of a desire to produce a dignified plan, though the corridors are not so direct as might be desired. The elevation to High-street is one of the best submitted in the competition, two somewhat lofty towers flanking the existing building, and the pediment and columns of the old work being repeated in the new wings.

"Mind and Work" has also an elevation which must be placed in the front rank of those submitted, though the detail is Italian Renaissance rather than English, and with a decidedly modern *cachet*, which is out of harmony with the existing work. The plan is unique in having both the Borough Court and the Council Chamber on the first floor, an arrangement which leads to the accommodation for the barristers, solicitors, justices' clerk, and witnesses being placed on the ground-floor, and the jury-rooms on the second. This can hardly be accepted as the best solution of the problem, although the plan generally is well thought out, except that the Mayor's Parlour, a triangular room with curved side, is of an inconvenient shape, and the corridors are defective in light.

"Prince Bladud" has the Police-court in the right position, but with the entrance in Orange-grove, and with the Council Chamber at the end of the frontage to that street,—an undesirable position. In his treatment of the exterior the author has produced a harmonious design by boldly altering the character of the central block with slender towers, and suiting his new work to the change of expression, instead of maintaining the original feeling.

"Three Horseshoes," by Mr. C. E. Davis, the City Architect of Bath, shows the principal entrance at the rear of the buildings and facing the Market approach, in this differing from all the other designs. The author provides for two new courts,—one for Petty Sessions, and the other for Quarter Sessions and County Court, and re-arranges the present Sessions Court for municipal offices,—a scheme which appears to have been regarded with much favour locally, though open to many objections in matters of detailed arrangement and cost. This plan is particularly strong in the provision made for legal business, but the planning of the Municipal Offices is not so admirable, nor can we approve the position of the Council Chamber, facing the High-street, on the first floor. The design of the exterior is spoilt by the domed cupolas at the angles, and both elevations and perspective are deficient in draughtsmanship.

"Queen Elizabeth" has the new Police-court in the most generally-adopted position, but places the Council Chamber in front next the High-street. The author places his entrance at the angle, and has gone rather out of his way to separate the two departments of legal and municipal business. The plan provides extravagant accommodation for the witnesses, in this differing from the majority of the competitors, who have provided too little. The mistake of the external treatment

is the inclusion of a lofty tower, which is both out of accord with the old work and in unhappy conflict with the central tower of the Abbey Church, its close neighbour.

"Adam" retains the old Sessions Court, but places his new court so far from it that the working of the two is rendered difficult. The plan is straightforward, but the corridors are insufficiently lighted, while the Council Chamber faces the High-street. The elevations harmonise well with the existing building, except that they are over windowed.

"In Unison" places the new Police-court in the rear on the ground-floor, but has the Council Chamber in front. The general idea of the grouping of the rooms is good, but is not so well worked out in detail. The exterior may be claimed to be "in unison" rather than in harmony with the old, the detail of which it merely repeats.

"Fortuna" has a circular entrance-hall at the angle of the site, with two corridors radiating therefrom. The Police-court and Council Chamber are in the position adopted in the selected design, and the plan is thoroughly workable, but lacks dignity, and the details are weak. The exterior has the merit of making the old central block of chief importance, but the general effect is marred by the contrast with the circular tower and domed cupola over the chief entrance.

"Bonâ-fide" is one of the plans which are too grandiose in arrangement for the necessities of the case. The entrance is at the circular angle, with a grand staircase adjoining. The Magistrates' Court and Council Chamber are placed in the best position, and the plan has many good points in the detail of its arrangement. The elevations are very much out of keeping with the existing building, both in proportion, fenestration, and detail.

"Plan" has the Police-court with the Council Chamber over, placed at the rear. The general arrangement of plan is good, but its detail shows a lack of knowledge; thus, the Mayor's Parlour, which is called in this plan Mayor's private room, errs on the side of being too private for the general use of a Mayor's Parlour. No attempt has been made to obviate the awkward lines of the site; many of the rooms, therefore, are of a very uncomfortable shape. The author of this design also has adopted the expedient of flanking the existing building with two small turrets, thus entirely altering its character. The perspective drawing is unskilful, and does not do justice to the design.

In conclusion, an unprejudiced estimate of the designs submitted shows that the selected design may fairly be regarded as superior both in plan and exterior treatment to the remaining designs sent in. The plan is well arranged, well lighted, and carefully avoids extravagance on the one hand and meanness on the other; while the exterior is certainly more completely in harmony with the existing Town Hall than any other design.

ARCHITECTURE AT THE ROYAL SCOTTISH ACADEMY.

THE exhibition of the Royal Scottish Academy has been looked forward to this year with somewhat more than usual interest. The Academy has quite recently obtained its new and more liberal charter, from which a good deal is expected. In the first place, a franker recognition was awaited from the younger painters who are variously called the "Glasgow," or "impressionist," or "modern" school, and who have hitherto found but grudging acceptance within rigid Academy ranks. Further, it has been announced with authority that architecture is no longer to be quite ignored. High time it certainly is that the Academy should end a scandal which stultified its own corporate existence. Dr. Rowand Anderson resigned Associateship years ago; and, since the death of Mr. J. Dick Peddie, there has been absolutely no architect on the Academic roll. That "the Royal Scottish Academy of Painting, Sculpture, and Architecture" should be for a length of time without one solitary representative of the art which claims to be the most central, the most all-embracing, of them all is somewhat ludicrous evidence—if evidence were needed—of how little Academies are with us the outcome of genuine and spontaneous art-needs.

This season's exhibition opened on December 19, some two months earlier than the usual date. As regards the pictures, it is satisfactory to find at once a frank and liberal recognition of the "modern" school. Mr. Lavery's splendid "Ariadne" has been given a place of honour; nor can "impressionism" complain after the way Mr. Henry has been placed. In another direction, an innovation on strait-laced academic ways has provided a rare opportunity of true art-study in the representative collection of the late President, Sir Wm. Fettes Douglas's works in oil—over fifty pictures hung together, though not, unfortunately, in chronological order.

But in architecture we are disappointed; the exhibition is thoroughly inadequate. The fault, however, can scarcely all be on the Academy's side; things "have gotten them" in a bad way, and the architects have possibly themselves to blame in part for the meagre show, and still more meagre interest, it arouses. Certainly reform is needed, thorough-going, and only to be achieved by hearty co-operation between architects as a profession and the Academy. Considerations of what the public do, or do not, care for, though often urged, are not to the point. A central Academy is not a sale-room for art-wares; it has to educate and elevate, not to subserve the public taste. Were it true that the public do not care for architecture, and refuse to take an interest in it, it would still be the Academy's part to place on record a due and adequate representation of the best contemporary work in architecture; but even as a speculation with the public, the experiment is well worth trying. As things are at present, it is simply hopeless for a visitor to make headway in any real study of the architectural exhibits.

In the Royal Scottish Academy's galleries architecture shares with sculpture the last of the suite of rooms. There are under thirty drawings, all sent by local men. In the whole Exhibition there is no single plan, no single section, and, with one (not brilliant) exception, no single geometrical drawing. Architecture, therefore, is represented pictorically, and nothing more; by pictures for the most part in black and white, conventional and manifestly most unreal. To a public that has passed through room after room of genuine pictures this necessarily means a sudden and complete collapse of interest. As a picture, no building, however great, will by any possibility vie in human interest with numbers and numbers of quite mediocre canvases on the adjoining walls. It is not short of folly, therefore, to make-believe a building is a picture, to exhibit this sham picture alongside genuine ones of first-rate worth, and then complain that the public, really wise in its generation, passes by. Still more ridiculous is it from the architect's point of view to think that a highly worked-up perspective is a reasonable interpretation of his art, that *that* gives forth the power and thought embodied in his creation, or in any vital way renders that creation obvious and "understanded of the people." Strictly, of course, no drawings at all will avail to do this; at best they are but diagrams, the only true architectural exhibit being ultimately the building itself. But at least the diagrams should be all there, to show in their entirety the problems solved and the means by which an architectural creation is arrived at and expressed. Is it any wonder that at present the belief is general that an architect thinks first of the "outside?" or that it is doubted if the "inside" counts at all? If architects are satisfied to show such "outsides" only, as would-be pictures, let them at least not blame a public that takes them at their word.

It is essential that architects should seriously offer an adequate and legible representation of their work; with plans, and sections, and elevations (coloured); with studies of detail, models of ornament, and decorative details worked out and presented properly in colour and relief. All this has long been recognised, and, of late at least, has been encouraged at the Paris Salon; nothing short of this will ever really make an exhibition of architecture as it really is, a living and creative art. It will, of course, be equally essential for the Academy to offer proper rooms for such exhibits, and to abolish restrictions that would fetter and exclude them, as at present.

In number, the works exhibited are about equal to the average of recent years; but there is nothing of first-rate importance, while certain names of architects are greatly missed. The apparently hopeless schism through which the foremost Scottish architect remains aloof from the Academy is much to be deplored; surely present time and circumstances are favourable for making up the breach. The recent Glasgow competition (which clashed in point of time) accounts, no doubt, for the total absence of works from the West at this Academy. This is none the less to be regretted; one would much have liked, at least, something from Mr. Leiper and Messrs. Burnet, Son, & Campbell (to name no others).

Of ecclesiastical work there are five designs exhibited. Mr. H. J. Blanc shows the east end of St. Matthew's Established Church (No. 482) as it will be when completed. It is scarcely happy that the three arms of a cruciform church should be much lower than the nave, particularly when the crossing is emphasised by an important *flèche;* but the tower and spire shown flanking the west gable will probably help the building much. As executed, the church wants breadth of treatment; the great west window is not a satisfactory design, and reduces the western door to rather mean proportions. The building has, moreover, the misfortune to challenge direct comparison with Dr. Rowand Anderson's New Free church, now being built close by,—a very powerful design, original in conception and instinct with the modern Presbyterian needs. The true interpretation in architecture of the Scottish Presbyterian Church, with its special needs and clearly-defined restrictions, has been too often met by an adaptation (scarcely logical) of the Anglican type of church. To some extent this is even true of Dr. Anderson's most dignified parish church at Govan, and of Mr. Leiper's extremely beautiful church at Hyndland (Glasgow). The problem is a vital one, and offers most tempting opportunities. It is a disappointment, therefore, to find it quite ignored, apparently, at this Academy. Mr. D. B. Burnie's Free church at Moffat (No. 544) is, so far as one can judge from the perspective, a case in point. The design is good, but stamped with no special character: there seems to be nothing particularly Scotch about it, and nothing Presbyterian; all which is emphatically true of Mr. Cameron's church (No. 483), with this difference, however, that the design is bad. Mr. F. W. Simon exhibits a "Design for a Gothic Church,—Lancet Period." The drawing is a fine one, rather forced; the design, it may be, unexceptionable, but not exceptional; a cruciform church, apparently, with lofty tower and spire abutting the south transept. There is nothing really original about it; "a church" which may be *any* church, and a design for no church in particular, can scarcely have much character. It is precisely in such a case as this,—a study of a special period,—that the need for plans and full drawings is most conspicuous. The same architect exhibits in water-colour a design for a church at Manchester, in brick and terra-cotta (No. 545). This is unfortunately "skied," but the treatment seems good, with a successful campanile filling in the angle of nave and transept. The main gable window is, perhaps, of rather doubtful proportions. Mr. H. F. Kerr's "Mission and Settlement Buildings" (No. 537), may suitably be mentioned here, a mission-hall adjoining a residence for Free Church students. As a design, the hall

gable is unaffected, and the house, with a double gable, pleasantly domestic; but it might have been much more characteristic of Edinburgh Old Town, and at the same time more collegiate in feeling.

Mr. Blanc's restoration of the old Parliament Hall in Edinburgh Castle is the most important work amongst public buildings, a restoration which Edinburgh owes to the liberality of the late Mr. Wm. Nelson. Two drawings (Nos. 530 and 542) are exhibited, a fine interior by Mr. Raffles Davison, showing the daïs end with the Greek fireplace, and a laboured water-colour of the wood-work screen. The great hooded stone fireplace is fine, but the little hooded grate beneath it is a mistake which perhaps we may be spared in real life; the somewhat operatic statues shown above are singularly out of sympathy with the stern and sombre feeling of this old Scotch hall; the intricate wood-work, too, scarcely seems in keeping. So important a restoration as this should have been illustrated with geometrical drawings and with careful renderings of the hall in its actual state before the work was undertaken, as would certainly have been done in France. Without these it is hardly possible to criticise the restorations fairly.

Messrs. Kinnear & Peddie send the entrance to the new railway station, Princes-street (No. 527), a geometrical drawing which is welcome, though plan and section are wanting, and which is not quite adequately shaded in monochrome. An unintelligible cast shadow as a background makes the base seem insufficient, and there is nothing whatever to establish scale, but the design is well worth study. This work is being executed in red stone, and, as carried out, bids fair to be an able piece of Classical design with masculine and well-studied detail, scarcely interpreted by this exhibit.

Mr. G. Washington Browne exhibits a perspective of his unsuccessful competitive design for Ayr Public Library (No. 492). This is a beautiful pencil drawing, full of delicacy and feeling, of a fine design, simple and exceedingly restrained, conveying most satisfactorily the semi-public, semi-domestic character of such a building in a provincial town; it is a pity no plan is added. The chief features in the façade are three very large bay windows, mullioned and transomed, running through the two stories and breaking slightly through the cornice. The roof is perfectly plain, with a very daring chimney rising through it. Mr. Browne also sends a rather hot and pasty water-colour of Messrs. Redfern's new premises in Prince's-street (No. 543), a florid design in banded red and yellow stone; Gothic for the most part, but emerging into full-fledged Renaissance up above.

Mr. J. G. Fairley's design for Edinburgh Public Library (No. 406) does not make one regret the design that has been executed; this is, however, a careful study of Classic work with less roeoco ornament than usually appears on Classic work in Edinburgh. The attic story would be overpowering in execution, with colossal busts in place of windows.

Another Public Library is shown by Mr. J. M. Fairley (No. 541), being his competitive design for the town of Brechin. The drawing is rather hard, but the building is suitable, a good design in simple Renaissance architecture.

The National Bank Buildings in High-street (No. 481), by Mr. J. M'Lachlan, are too full of "features" to be either genuinely Scotch or restful in design; they are a fair example of much of the work of recent years, infinitely preferable to the Classical intrusions that ruin the old High-street lower down, but still not altogether satisfying. The "city improvement" type of building has robbed Edinburgh of far too much of its character of local charm in recent years.

Of Domestic architecture there is a good deal, and much of it is good. Messrs. Sydney Mitchell & Wilson send a very fine perspective, by Mr. Raffles Davison, of Duntreath Castle, entrance front (No. 502). This is a great pile of buildings of much dignity, the entrance, a fine arched gateway in a long façade, flanked by two circular towers; the nearer angle tower is bold and good, and the whole design is well balanced and composed, stately, and genuinely Scotch in character. "Greenfield, near Alloa" (No. 539), by the same firm, is not so important nor so satisfactory, the design more commonplace, and the entrance tower robbed of its dignity by a curious erection on its roof. Messrs. D. & J. Bryce show a rather old-world water-colour of additions to Fyvie Castle (No. 517), a thoroughly sensible piece of work, dignified, and in harmony with the original building. "Ferguslie Park," by Mr. H. J. Blanc, for Col. Glen Coats (No. 404), is a beautiful drawing, but the design is greatly wanting in repose. Mr. Leadbetter's addition to a most interesting old building in Ayrshire, "Blair" (No. 488), is an excellent piece of Scotch Domestic work, most harshly drawn. Mr. S. H. Capper exhibits a view of an Orphanage at Whiteinch, Glasgow (No. 540), a piece of modern Scotch Domestic work, powerfully drawn by Mr. C. E. Mallows; a water-colour (No. 500), also illustrates a portion of this building. Mr. F. W. Simon's slight but delicate pencil sketches of a House at Inverleith Place (No. 538), are a good example of quiet Domestic work. Mr. Jerdan and Mr. J. G. Fairley contribute (Nos. 491 and 493) additions to existing buildings; the latter a very abrupt perspective in water-colour, in which the surroundings rather minimise the architecture, which is, perhaps, not grievous. It remains to mention Mr. Crawford's Design for an English Country House (No. 489), and Mr. Hay's Cottages (No. 529) to complete the list. An etching by Mr. Phillimore, and a sketch of an old (restored) interior by Miss Cunningham, are also included, and a design for a stained-glass window by Mr. Stephen Adam.

NOTES.

WE print in another column the correspondence which has taken place between the President of the Institute of Architects and the First Commissioner of Works in regard to the unfortunate disfigurement of Somerset House, which has aroused so much indignation. We are not surprised at the result. Our experience is that when a thing of that sort is once done it is never undone again, and the authorities of King's College and their architect, whoever he is, may have what satisfaction they can derive from the reflection that they have thoughtlessly and with a light heart inflicted a permanent disfigurement on one of our finest buildings, and that no one has any power to undo the mischief they have done. The only satisfactory point about the matter is that we are at least definitely informed that the official authority which has control over our public buildings has not been implicated in this discreditable piece of work, and that the First Commissioner of Works would obviously be very glad to compel the removal of the new building if he had the power to do so. Considering how much we have suffered from the general indifference of the Office of Works to architectural beauty, we may be glad to find that there is some limit to their complacency, and we hope that they will endeavour to guard against such disfigurement of the national buildings under their charge for the future.

AT a public meeting, held at Aberdeen on the 1st inst., it was resolved to seek aid towards the estimated cost,—60,000*l.*,—of enlarging the Marischal University buildings, the Town Council having voted 10,000*l.* A correspondent of *Notes and Queries* points out that for the proposed "opening out" of the college front the demolition of a block of houses in Broad-street is contemplated. In that block is the house,—it was numbered 64 thirty years ago,—wherein Byron and his mother are reputed to have lived, 1792-8.* On leaving "Bodsy" Bower's school in Long Acre (Aberdeen), where he was charged one guinea for twelve months' teaching, Byron was sent to Ross, a minister, and next to the old grammar school, near to the gate of Gordon's Hospital. There he remained from April, 1794, to May, 1798, in which latter month his master hailed him as "Dominus," on his succession to his grand-uncle's title. The school, built in 1757, is, we believe, the smaller house shown in an illustration we published on October 3, 1885, of George Jamieson, the portrait-painter's, house on School-hill, supposed to have been St. Nicholas manse. The new buildings for the grammar school, founded in the thirteenth century, were erected on a fresh site in 1861-3. A correspondence recently appeared in our contemporary in respect of the block of three houses,—formerly one,—now numbered 24-5-6, Savile-row, near the end of New Burlington-street, and which, if the tale be true, should take its place amongst the list of Lord Byron's residences in London. A recent extension of a large shop involved the destruction of his birthplace,—a house on the western side of Holles-street, Cavendish-square,—which was distinguished by its red-brick front having a single line of windows.

THE decision in "Savory & Moore *v.* the London Electric Supply Corporation (Limited)" is a serious blow to the transformer system of electric lighting. Unless the decision be reversed on appeal, or new legislation be instituted on the subject, transformer stations can in future only exist on sufferance, being at any time liable to be closed as a danger and a nuisance at the suit of the occupiers of the adjoining premises. Mr. Justice Kekewich was doubtless guided in his judgment by the fact that two fires had already occurred at the Bond-street substation, which fact would make him more ready to accept the startling statement that "electric cables and step-down transformers are of a highly inflammatory and combustible nature." So they are, and so is pig-iron under certain circumstances, but not in the commonly-accepted meaning of the words. According to the *Morning Post*, "Mr. Justice Kekewich said that the powers and dangers of electricity were at present not sufficiently known, especially in the heart of a crowded city." It is improbable that his Lordship based his decision on the ignorance of great cities, and we take the above as the reporter's way of saying that he regarded high-tension currents and transformer stations as especially dangerous in crowded cities. This is poor comfort, however, for the electric light industry, for a transformer, to be of any use, must needs be near the consumer, and generally in a populous district.

ANOTHER attack on alternating current lightning comes from an unexpected quarter. Mr. Waterhouse, A.I.E.E., in the *Electrical Review*, reiterates the statement that a lamp fed by an alternating current is more trying to the eyes than a direct current lamp. So long as this statement was made by "Student" in the daily press, one could afford to smile at it, but when it comes with some show of authority it may require more serious answer. Mr. Waterhouse instances a billiard-marker who was obliged to give up his employment on this account. The fact may be so, yet the inference erroneous. There are few things more trying to the eyes than playing billiards in a half-light, and we know of one billiard-room, at least, in which the alternating current is used, where, either from carelessness in selecting the lamps of too high voltage, or because the installation is inefficient or ill-managed, games are often played in semi-darkness. If the light from an alternate current lamp were really dis-

* Moore says, in his "Life," that Mrs. Byron first stayed, with her husband, at Anderson's, in Queen-street. Thence she soon took her son to lodgings in Virginia-street, whence they removed to, he thinks, Leslie's, in Broad-street.

continuous, like the shower of sparks from an induction coil, it might be optically unpleasant,—the tired feeling in the eyes after looking for some time at a zoetrope is well known: but it takes *time* for a carbon filament to cool, and the alternations are too rapid to allow of any sensible variation in the temperature, and, therefore, in the brightness of the filament.

THE Hepworth Urban Sanitary Authority seems to have been for some time back in a very slumbering state, to judge from the circumstances detailed in Dr. Barry's report to the Local Government Board. It appears that some time since the Local Government Board had occasion to write to the Hepworth Authority calling attention, among other things, to the fact that among twenty-nine nuisances reported in 1888, twenty-four remained unremedied at the close of the year, and that of seventy-nine nuisances reported to the Authority in 1889, seventy-one remained unremedied at the close of that year, although most of these nuisances were of a serious nature, and in some cases related to unwholesome conditions endangering the water supplies. The reply to this admonition being unsatisfactory, Dr. Barry went down to make a local inquiry. His report includes the following statements as to the condition of the district:—

"The houses are, as a rule, substantially built of stone, and there is little or no crowding of dwellings upon area. The ventilation of a number of the houses, however, is insufficient. A considerable number are damp from want of proper eave-spouting, and some were noticed at Far-lane, Hepworth, where, in addition to want of eave-spouts, earth was banked up against their back walls. Throughout the district there is inefficiency of surface drainage about dwellings. At Jackson Bridge there is a row of houses built at the base of a rocky cliff. Between the rock and the houses, the whole space is unfurnished with means for surface drainage, and is crammed with pigstyes, privy middens, fowl-houses, and pigeon-cotes; whilst the slop drainage from some houses situate at a higher level runs down the side of a road and gains access to the back space noted above. At Lower Foster-place, a house, barn, and cow-house are situate one above another on the side of a hill, and liquid manure from the last-named trickles down to the front of the dwelling-house.

Water Supply.—The water supply of the district is chiefly obtained from springs and wells. In nearly all cases where springs are a source of supply the water is conveyed to dip troughs, and in many instances the water supply is situate at an unreasonable distance from the houses. At Barnside the water supply is partly obtained from a trough situate in a farmyard, and partly from a shallow well at the roadside. Jackson Bridge is entirely unprovided with a water supply, the inhabitants having to fetch the water either from a mill situate in the Scholes district, or from Hepworth village, *nearly a mile distant.** At the outlying farmhouses the water is obtained, as a rule, from dip troughs fed by surface springs, and frequently liable to pollution. . . Excrement and refuse is universally disposed of in privy middens, which are almost without exception of large size, and are all so constructed as to prevent the proper mingling of ashes with the excreta. Many of these middens are sunk below the level of the surrounding soil, and some are, in addition, uncovered. One uncovered privy midden, situate in Far-lane, Hepworth, was of sufficient size to contain at least twenty cartloads of refuse. At Lower Barnside privies are situate at different levels at opposite ends of a huge midden, the filth from the privies at the higher level forming a cascade towards those at the lower level."

The report adds that the inspector of nuisances (Mr. Lewis B. Hornblower) has reported systematically the defective conditions of the district, but that until quite recently no action has been taken on his reports. Apparently the Local Government Board has now succeeded in creating some movement among the Hepworth authorities.

WE have also before us a report from Dr. Barry on the sanitary circumstances of the Lepton Urban Sanitary District, which, like the last-mentioned report, was the result of a visit of inspection following upon an unsatisfactory correspondence. The Lepton authorities seem, from the correspondence, to have been very indignant at being found fault with; but the following extracts from the report show that remonstrance was not offered before it was called for:—

"There is very little crowding of dwellings upon area in the district. A number of houses, however, in old hamlets, as, for instance, at Lascelles Hall and Great Lepton, are old, dilapidated, ill-ventilated, and damp; some being quite unfit for habitation. At Spa Green houses have been erected within recent years which are unfurnished with any back space exclusively belonging to them, and have neither back windows nor back doors; whilst at Lascelles Hall a block of houses has just been constructed on the back-to-back plan. Both sets of houses have been erected in direct contravention of the Sanitary Authority's Building By-laws, a matter which will be again referred to later on in this report. About the older houses of the district there is inefficiency of surface drainage, and a considerable number of these houses are either unspouted or insufficiently spouted, so that the walls and foundations are, in consequence, damp.

Water Supply.—Rather more than half of the inhabited houses of the district,—practically all those not situated on the central ridge,—receive their water-supply from the mains of the Huddersfield Corporation. The remaining houses obtain their water from dip-troughs, dip-wells, cellar-wells, and pump-wells; sources of supply in many cases situated at unreasonable distances from the houses, and frequently liable to pollution. In dry seasons there is, for many people, often great difficulty in obtaining any water at all, except at distances varying from 500 yards to a mile or more. At Lepton Town Bottom and Great Lepton the water is obtained from surface springs, and when, as in time of drought, these fail, from a well *about a mile distant.** . . . In all the hamlets of the district there are drains of some sort; in fact, it is stated that there are four miles of public drains in the district, of which about half are constructed of rubble. None of these drains are provided with any special means for inspection, ventilation, or flushing. The sewage, which is allowed to run either on land or into the nearest water-course, is, in no case, submitted to any form of treatment at its outfall. . . . . The use of privy middens for the disposal of excrement and refuse is universal."

THE *Chemin de Fer Glissant*, which attracted so much attention at the Paris Exhibition, after failing to get beyond the experimental stage in Europe, appears about to reach the dignity of practical application amongst the novelty-loving Americans. It is stated that a company has been formed in Chicago to build a railway on this system, with the privilege of extending it to a distance of 500 miles; and it is announced that it is contemplated to carry the line as far as Milwaukee. Undoubtedly the system offers immense advantages. The chief direction in which railway inventive enterprise might make advance is in the reduction of noise, and jar or vibration. This is just what the sliding railway offers. The general opinion of engineers in this country was that the thing was too good to be true; but if the enterprising Americans prove that the system is by any means practicable, people will soon refuse to put up any longer with the noise and rattle of wheeled vehicles. It may be that a change, second only in importance to that brought about by George Stephenson, is looming up. At present, however, it does not loom very large.

A STRIKING, not to say sensational, experiment, was recently performed by Professor Dewar at a lecture. Liquid oxygen in a crystal dish was placed below the poles of a large electro-magnet. On the magnet being excited the oxygen left the dish and clung to the poles of the magnet, as a mass of iron filings would do, until it was dissipated by evaporation. It would be rash to say that this vivid demonstration of the highly magnetic qualities of oxygen will never be turned to any practical use, but at present we cannot even conjecture in what way, if any, it will be turned to the service of man. Meanwhile, there is a great opportunity for the electrical quacks,—all diseases cured by inhaling magnetised oxygen. There are people who buy "magnetic pills," and pills "highly charged with electricity." So, possibly, magnetised oxygen may have a chance as a curative agent.

* The italics in both cases are our own.

IN a paper read at a recent meeting of the American Society of Mechanical Engineers, Mr. J. W. Cole, of Columbus, Ohio, described a new form of combination pavement which has been tried in his city. It consists of a series of iron castings which form a series of rectangular cells or pockets, closed at the bottom end. These pockets are filled with green oak blocks $3\frac{7}{16}$ in. square on the top, and 5 in. long. The blocks are driven into the pockets for a distance of 3 in., so that they project about 2 in. A trial piece of this pavement was laid down in a part where the traffic is very heavy, owing to a railway goods-yard being in vicinity. After three months, the blocks, which, of course, are placed endwise of the grain, had been hammered or worn down $\frac{1}{4}$ in. It is claimed that this paving supplies a substantial roadway, a good foothold for horses, and a practically noiseless roadway suited to heavy traffic, and also comfortable for pleasure driving.

THE Brighton Guardians, from a paragraph printed on another page, appear to have set on foot a new departure in architectural competitions, in advertising, not for plans, but for the names of architects willing to prepare plans for their new Parochial Offices on the lowest terms. The distinction of being successful in this novel and elevating form of architectural competition has been obtained by a Brighton firm of architects, who are to have $2\frac{1}{4}$ per cent. commission if the cost of the building does not exceed 5,000*l.*, and 2 per cent. if it does. It appears that twelve architects "residing or practising in Brighton" were willing to respond to this kind of invitation. We congratulate Brighton on its architects, and the successful firm on the distinguished position they have attained; and, perhaps, we may congratulate the Brighton Guardians most of all on their intelligent and refined perception as to the status of the architectural profession, and their public spirit in being willing to spend public money, not on the best building, but on the cheapest architect.

PORTLAND CEMENT AND CONCRETE:

THE INSTITUTION OF CIVIL ENGINEERS.

AT the second ordinary meeting of the session, on the 17th ult., the President, Mr. George Berkley, being in the chair, three papers were read relating to Portland Cement and Portland-Cement Concrete.

The first was "Portland Cement; its Manufacture, Use, and Testing," by Mr. Henry Kelway Bamber, F.I.C. The author gave analyses of the most suitable clays and chalk to be used in the manufacture of Portland cement, and described the process of preparing and mixing these ingredients, drying the resulting slurry, and of burning. The average composition of good cement was indicated. In these operations care and constant chemical testing were necessary to keep the ingredients in proper proportions, so as to ensure the regular percentage of each in the finished cement.

Reference was made to the packing in the kilns of the dried material in lumps of a size not too large to prevent the heat from being evenly distributed through the entire kiln, otherwise there would be a large proportion of insufficiently burned and unclinkered produce. In clinkering, the material entered into semi-fusion only, and it was during this process that the properties of good cement were produced. Given, therefore, proper proportions of ingredients and proper burning, so as to obtain good clinkers, the result would be good cement. This had next to be ground to fine powder and sifted, so that all should pass through a sieve of 2,500 meshes to the square inch, and not less than 90 per cent. should pass through a sieve of 5,625 meshes to the square inch. The finer the cement the more easily was it thoroughly mixed with water, which ensured its proper setting without the chance of blowing afterwards. About 40 lbs. of water should always be used to every cubic foot of cement. This would ensure that every portion of cement should have the full quantity it could combine with, and if this were done no blowing could take place, because blowing was caused by portions of cement taking up water and ex-

panding after the body of the cement was set. The author made experiments three years since with concrete composed of 4 parts of shingle, 2 of sharp sand, and 1 of cement. These were mixed in duplicates, the first lot with the full quantity of water it could take, and the others with only half that quantity of water. These blocks after twenty-four hours were put on a wall and were covered twice every day for twelve months by the tide. At the end of the year they were cut through the centre. Those made with the full quantity of water were sound, hard, and perfectly dry all through; those made with half the quantity of water were wet through and easily broken to pieces. As there was no difference in any of the ingredients except the quantity of water used, this showed that for concrete to set properly and satisfactorily it must at the outset have the full quantity of water mixed with it. These blocks were made with new cement a day or two old, showing that new cement was perfectly safe if mixed in proper proportions. In the ordinary course cement would be about a month old when used, and there was no advantage in keeping it longer, for it began to lose its power of combining with water, an old cement not being able to absorb and combine with nearly so much water as new cement. In newly-ground good cement the particles were in such a molecular state as to quickly combine with water, forming a hard permanent crystallised solid. By age there was evidently a molecular change gradually taking place, for after a time the cement, although not exposed to the air, lost its power of setting when mixed with water, although the percentage composition might be exactly the same.

The author then described the best test to determine if the cement were good:—First, there should be a chemical analysis to show the proportions in which each constituent existed, but as this in itself was not sufficient to show if the cement had been fully clinkered, he recommended the taking of the specific gravity, which should not be less than 3·10 to 3·15 at the end of a month. This was much more reliable than the ordinary use of the striked bushel, which varied considerably, according to the way in which the vessel was filled. Then ensued the mixing of the cement with water, and the forming into briquettes, to test the breaking strain at 7, 14, and 28 days. The quality of water in these briquettes varied with each manipulator, the general desire being to use as little water as possible. The author thought, however, that it should be stipulated how much water should be used in making the briquettes, when the results with the same cement would be more uniform, for a cement that could not take up its full quantity of water, —20 per cent. to 25 per cent. of its weight,— was not as good as one that could do so, other things being equal. A good cement, not too old, would expand in setting, and completely fill the space allotted to it, whereas an old cement would not do so, and consequently spaces would be left for water to enter and weaken it.

The second paper, by Mr. Alfred E. Carey, M.Inst.C.E, was entitled "The Inspection of Portland Cement for Public Works." The author emphasised the following points: Uniformity of the raw materials; completeness of the mechanical blending of the raw materials; the proportion of carbonate of lime; the thoroughness of the wet-grinding; the burning; the flouring; the aëration and packing of the finished cement.

Particulars were given of the chemical analysis of various clays in use, and it was pointed out that the hydraulic factors were the silica and alumina, with iron, and that the highest standard of quality was probably attained when the ratio between these was

$$\frac{\text{Lime}}{\text{Hydraulic factors}} = 2.$$

The various processes for the mechanical blending of the raw materials were described, and special stress was laid upon constant chemical testing at this stage of manufacture, and also on the thoroughness of the blending in a wet state.

In regard to burning clinker, the author traced the various chemical changes which took place, and the corresponding temperatures. He considered that a temperature of about 2,900 deg. Fahr., maintained for a short time only, was the most favourable for producing high-class clinker.

He described the more recent systems of burning cement, giving details of the Ransome and Joy processes, and advocated the adoption of the test by specific gravity instead of by weight per bushel. He proposed for this standard, 3·1; a high specific gravity combined with extreme fineness being one of the surest means of proving that a given sample of cement was well burnt.

In respect of fine-grinding, it was pointed out that it was the flour or impalpable powder which formed the effective part, the nibs or coarse residue forming an adulterant similar to the admixture of a corresponding proportion of sand. This was proved by a series of experiments, in which the residues, on a succession of sieves, were removed from a given sample of cement, when the tensile strains were proportionately increased. The question of the dry-grinding and the temperature of cement, as it left ordinary mill-stones and edge-runners respectively, was then referred to. The author considered aëration essential with cement as now usually manufactured.

With regard to packing, the want of a less expensive and more efficient packing-case than the ordinary cement-barrel was mentioned. The author suggested that for foreign works clinker might sometimes be conveniently exported and ground on the spot.

As to the question of testing, he considered that a test of $\frac{1}{2}$-in. × $\frac{1}{2}$ in. section would in some cases be a useful guide, and described the various apparatus now in use for the purpose of compression-testing, calcimeter-testing, taking specific gravity, &c. On the question of standard regulations, the rapid progress which had been achieved in quality in England, despite the absence of any Government tests, was pointed out, and it was stated that had such a standard been formulated ten years ago, its effect would probably have been retrograde. The practice of foreign Governments and societies as to standard tests was detailed, and a specification was given applicable to the present stage of cement production. Minute particulars of the various points to be noted in gauging briquettes were given, and the subject of the adulteration of cement was dealt with. The author did not believe adulteration was much practised in this country, although the Society of German Cement-Manufacturers had thought it desirable to formulate special rules on the subject as regarded Germany.

In dealing with the use of cement, the author stated that, in his opinion, cement and concrete were likely to take the place in many respects of iron and timber as now applied. He also gave particulars of a series of experiments carried out by Mr. Joseph Cash, M.Inst.C.E., at his request, in order to test the power of Portland cement to resist long-continued hydrostatic pressure. These tests were made with concrete of varying proportions, and a further series was carried out to ascertain the extent of the penetration of cement on the surface of a mass of rough concrete. Another series dealt with the question of the extent to which rough concrete would prevent filtration. The efficacy of rendering a surface of concrete in connexion with hydrostatic pressure was also discussed. The quantity and purity of water for concrete making was referred to, the author detailing the results of the admixture of fine river-mud of varying proportions on the strength of concrete blocks. The effect of the presence of sulphuric acid as observed by experiment was given, as also the effect of frost upon cement briquettes, and *per contra*, of high temperatures such as prevail under tropical conditions. The effect of sea-water on the maturing of concrete was dealt with, the author considering that when gauged with sea-water, concrete matured more rapidly and passed more quickly into the crystalline condition than when gauged with fresh water.

The limits within which concrete might be safely applied, more especially on works in the sea, were defined, it being shown that two distinct issues had to be considered in dealing with this much-debated subject:—1. The influence of magnesia as an ingredient in the manufacture of cement. 2. The alleged deterioration of sound cement when subjected to the action of sea-water. He showed that caustic lime or caustic magnesia were both harmful in cement, but that a high percentage of magnesia, when clinker was well burnt, was not necessarily deleterious.

In dealing with the second branch of the subject, the author pointed out the desirability of Portland cement not containing more than 4 or 5 per cent. of magnesia, because this material was really an adulterant, and not actively useful. He detailed particulars of a series of experiments with cement-sand briquettes of varying proportions, which had been exposed to long-continued tidal action without harmful effects, and gave the increase in the weight of these briquettes. He also referred to a series of tests with fresh water, varying proportions of fresh and sea-water, and sea-water partially evaporated, it being pointed out that in situations in which ammonia might be brought into contact with concrete it was desirable to use fresh water for gauging, and to exclude cement containing any considerable proportion of magnesia. The author's opinion was, however, that no conclusive evidence had been adduced to prove that the precipitates from sea-water induced disintegration of even fissured or porous concrete when sound cement was used.

In conclusion, the author referred to the chemical and physical transformations of Portland cement in setting, and the general chemical conditions under which Portland cement of the highest class was obtained.

The third paper read was on "The Influence of Sea-Water on Portland Cement Mortar and Concrete," by Mr. William Smith, M. Inst. C.E., of Aberdeen. In the course of a discussion which took place at the Institution in the year 1886, the author, who was the Engineer of Aberdeen Harbour, had stated that since the construction of the South Breakwater at that place, in 1872, he had noticed "the disintegration of the surface of the concrete by the chemical action of the salt water on the Portland cement." The softening and swelling of the concrete wing-walls at the entrance of the graving-dock induced him in the following year to refer the matter to the late Professor Brazier, of Aberdeen University, for a thorough investigation of the chemical reaction causing disintegration. In June, 1887, that gentleman gave his opinion that the analyses of the series of decomposed cements (concrete) showed a remarkable difference in composition from the original cement, inasmuch as in all the samples submitted to him there was found a large quantity of magnesia, and a large proportion of the lime was in the form of carbonate. He believed that this alteration was brought about entirely by the action of sea-water upon the cement. There was no other source for either the magnesia or the carbonic acid. The author then reported that "the rapidity of the chemical action was due to the unbalanced pressure of the water on the wing-wall" when the dock was emptied. This caused a current of sea-water through the porous structure of concrete, which continually washed the decomposed cement into the dock, and brought new particles of concrete into contact with the sea-water. In July, 1887, Mr. P. J. Messent, M.Inst.C.E., was requested to make an independent investigation of the cause of the deterioration of the concrete, and in the following November issued a report confirming the results obtained by the author and Professor Brazier, by experiments at the Tyne Piers, and by additional analyses of the disintegrated concretes by Mr. Pattinson, the Public Analyst for Newcastle-on-Tyne.

From a series of experiments and investigations by Professor Brazier and himself, the author inferred the cause of the expansion of concrete, subject to the influence of sea-water, to be the formation of a more bulky compound of magnesia and lime with carbonic acid, and especially with sulphuric acid and water, in place of the lime of the cement. The chemical equations for the action of the lime in the cement upon the magnesian salts in sea-water were:—

Magnesia chloride + calcic hydrate = magnesic hydrate + calcic chloride.

Magnesic sulphate + calcic hydrate = calcic sulphate + magnesic hydrate, the sulphate of lime crystalising with water as:—Calcic sulphate + water = hydrated calcic sulphate, a substance of great bulk compared with the lime base.

The lime of the cement took up the free carbonic acid from the sea-water, forming carbonate of lime; the sulphate, carbonate, and hydrate of magnesia in the sea-water were filtered out and united with the lime, forming a deposit of magnesia and hydrated sulphate of lime, which, being bulkier than the lime base, caused swelling and disintegration of the concrete, while the magnesia destroyed the adhesive power of the cement.

The author proceeded to point out, from experimental tests carefully made, that the presence of magnesia in the cement, before mixing with water and setting, was not the cause of subsequent disintegration, and that even 5 per cent. of magnesia in the cement only diminished its tensile strength 20 per cent., causing no tendency to disintegration. Sulphate of lime and carbonate of lime might similarly be present in the unslaked cement without much harm or any tendency to subsequent disintegration of the concrete. The disintegration was clearly due alone to the chemical reaction between the sea-water and the lime of the cement. All the lime (about 60 per cent.) of the cement was, so far as affected by this action, quite free, there being no stable chemical combination of the lime, alumina, &c., in cement.

A series of experiments on the filtration of sea-water from a height of 24 ft. through porous blocks of concrete was given in a tabular form in an appendix, showing, by the gradual decrease of the quantity of water passing through, the closing up of the pores of the concrete by the accumulation of the chemical by-products in the material.

The paper concluded with a description of the effect of the compression of air by the inflow of sea-water to cavities in the breakwater in bursting out the concrete blocks forming the sides of the cavities. The conclusions arrived at were,—that the chief causes of the destruction of concrete sea-works were the chemical action of sea-water, and the sudden compression of air within the structure by waves; and that the same remedy applied to both evils, namely, the formation of an impermeable homogeneous structure.

SOMERSET HOUSE AND KING'S COLLEGE.

The following correspondence was published in the *Times* of Monday last:—

"Sir,—I beg leave to hand you a copy of a letter from the Secretary of her Majesty's Office of Works and Public Buildings relating to the addition now being carried out at King's College, to the serious detriment of the river front of Somerset House. All credit is due to the First Commissioner for the prompt manner in which he has endeavoured to bring about the removal of an edifice which never ought to have been erected, and which, in the opinion of competent judges, inflicts irretrievable injury on one of the best and most justly admired public monuments of London. It is with keen regret I learn that the powers of the Office of Works are not sufficiently comprehensive to achieve the result desired by the First Commissioner, in common with all other lovers of architecture.—I am, Sir, your obedient servant,

J. Macvicar Anderson, President of the Royal Institute of British Architects.

9, Conduit-street, Hanover-square, W., December 19.

"Her Majesty's Office of Works, 12, Whitehall-place, S.W., December 16, 1891.

King's College Buildings.

Gentlemen,—In my letter of November 12, I informed you that the First Commissioner was in communication with the Council of King's College on the subject of the addition to the College buildings recently erected at the eastern end of Somerset House.

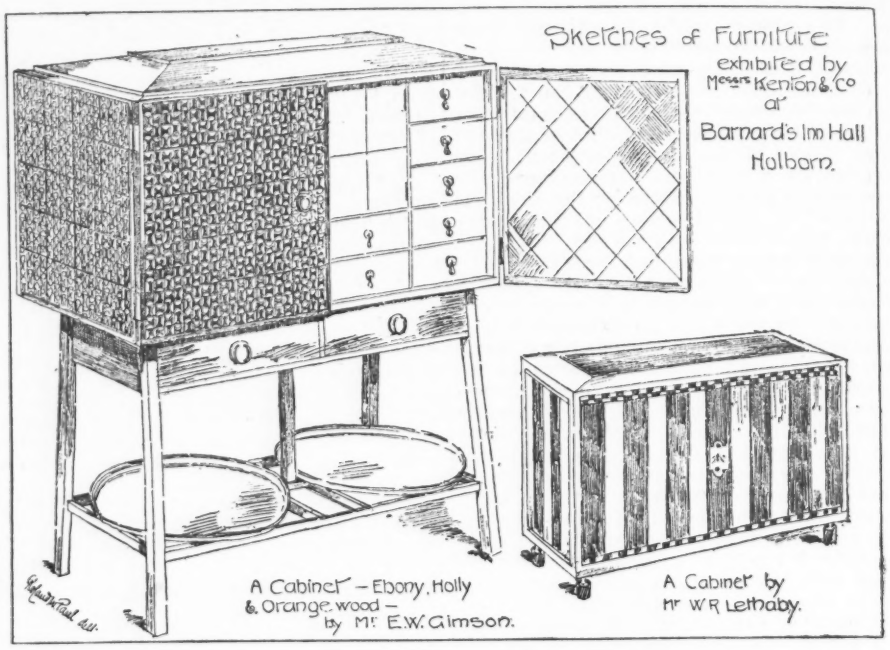
Mr. Plunket is aware of the great interest which the Royal Institute of British Architects has taken in this matter, and he therefore desires me to let you know what has passed, and the position in which it now stands.

When it was found that building operations were being carried on, directed to the addition to the College of a structure which must seriously affect the river frontage of Somerset House, the First Commissioner deemed it his duty to communicate with the Council on the subject. Accordingly, on the 2nd ult., after some preliminary investigations, he caused a letter to be addressed to them, in which he claimed (as he believed he was entitled to claim) that under the deed of grant by which, in 1829, the land was made over to the Council, the assent of the Crown was necessary before additions could be made to the buildings of the College.

To this claim the Council demurred, and the point was then referred by him to the law officers of the Crown. They have now given it as their opinion that the Council are within their right in erecting the structure in question, and that unless it interferes with the light and air of Somerset House the First Commissioner has no controlling authority. It cannot be said that the new structure does so interfere, and while the First Commissioner entirely concurs with your society in considering that it impairs to a lamentable degree the architectural effect of the river façade, he is compelled to conclude, though with great regret, that it is not in his power to pursue the subject further.—I am, Gentlemen, your obedient servant,

H. W. Primrose.

The Hon. Secretary and Secretary to the Royal Institute of British Architects."


Sketches of Furniture
exhibited by
Messrs Kenton & Co
at
Barnard's Inn Hall
Holborn.
A Cabinet – Ebony, Holly & Orange wood – by Mr E.W. Gimson.
A Cabinet by Mr W.R Lethaby.

SKETCHES OF FURNITURE AT BARNARD'S INN.

The subjoined sketches represent two of the articles of furniture in the exhibition of "Kenton & Co.," mentioned by us last week; the one being the cabinet designed by Mr. Gimson, to which we drew special attention, the other a small cabinet designed by Mr. Lethaby.

A THERMO-ELECTRIC STOVE.

A good deal of attention has been paid by physicists from time to time to the invention of a device by which light and heat, suitable for domestic use, might be at once produced. Naturally the thermo-pile has been the direction to which these labours have been chiefly directed; but hitherto, we may say, with small show of success. The matter, however, is so promising in the abstract that, until the practical details are conclusively proved to be an insuperable bar, we shall always look with interest on any labours in this direction. It is well known that by heating wires composed of different alloys and twisted together, an electrical current can be obtained. The latest manifestation of this source of energy has been M. Le Chatelier's pyrometer, which has proved of late such a boon to metallurgists. Dr. Giraud, of Chantilly, has been turning his attention to this problem of heating and lighting from a single source. That it does not pay to use thermo-electric batteries simply as a source of energy for lighting purposes will be easily understood when it is stated that no more than about 0·5 per cent. of the thermal energy of the fuel is obtained in the circuit. From this it is evident that a vast proportion of the heat produced by combustion must go to waste. M. Giraud proposes to use this waste heat for warming purposes, and looks on the electric current, as it were, in the light of a by-product. To this end he has devised a stove which is described in *Le Génie Civil*, vol. xix., pp. 30-46. This stove resembles in its exterior aspect an ordinary heating stove. Inside, the products of combustion rise vertically in a cylindrical chamber, and then descend in a space formed by the walls of this chamber and those of a second cylinder surrounding it. In their course the heated gases are brought into contact with a number of rectangular boxes stamped out of sheet-iron, and in these are placed the thermo-electric elements, which are about seven in number, and consist of couples of nickel or tinned iron, and an alloy mainly composed of zinc and antimony. Other metals are also added in small quantity, but these are merely to prevent in some measure the fusion of the couple. The elements are insulated by asbestos, and cooling is effected partly by the shape into which the elements are cast, and partly by circulation of air. The useful output is stated to be 40 watts, equal to about one kilowatt-hour per day for continuous working. To produce this result about 61·6 lb. of coke require to be burnt per day. Taking the price of this at 2 f. 75 c. per cwt. (the figure quoted in *Le Génie Civil*), the price per kilowatt-hour (according to the same authority) would be 15d. This is the price of electricity charged by the central stations in Paris. So far the facts are in favour of the new system, but the current from the couples is so small that it would take an altogether disproportionate amount of stove to supply any considerable proportion of light, and in consequence storage batteries have to be used. The attendant loss and increased cost of these appliances must be taken into account. On the other hand, it should be remembered that heating is required for many more hours than lighting, and the electrical energy which would be otherwise lost during the daylight hours would be conserved by the accumulators.

M. Giraud's experiments are, at the least, extremely interesting and suggestive, but we should require much fuller information before we could build on them very substantial hope of so pleasant a solution of the domestic electric-light question.

NEW YORK STEAM SUPPLY SYSTEM.

The system by which steam is generated at a central station and distributed to various users over a considerable area of New York has now been in operation for nine years with a varying measure of success. At the last meeting of the American Society of Civil Engineers, Mr. E. E. Emery, M.Inst.C.E., read a paper in which he gave some details of the working. The chief point of interest is the abandonment of return mains, by which the condensed water was carried back to the station. The paper states that the steam mains are apparently in as good condition as when laid, having been under a pressure of 80 lbs. continuously day and night; but the return mains have proved a failure on account of external corrosion. Both the steam and return mains were coated when laid with hot asphalt varnish. The varnish on the steam-pipes remains good, but that on the return mains has become detached in large patches owing to the action of rust. This was followed by pitting of the pipes, which was carried to such an extent that ultimately they became perforated, and the water would escape. The reason given is that the carbonic acid of the atmosphere and the soil,—the principal active element in inducing corrosion,—is particularly active at about 210 deg. to 220 deg., a range of temperature corresponding to that in the return mains. At lower temperatures the action is less violent; and at higher temperatures, such as those of the steam mains, the moisture is repelled, water, on touching the pipes, at once assuming the spheroidal state. In consequence

of this state of affairs, the New York Steam Company decided to do away with the return pipes and allow the water, on condensation, to run to waste in the city drains.

As is well-known the company supplies a good deal of steam for heating purposes, and Mr. Prentice, the manager, has devised a system by which high-pressure steam is used in engines which drive electric-lighting machinery; the exhast steam being carried off at 30 lbs. to 40 lbs. pressure, and used for heating purposes. A very moot point in first starting this steam supply system was the provision to be made for expansion and contraction of the pipes when heated. This difficulty appears to have been entirely got over by the use of a form of expansion-joint known as the variator. It may be added that there are two chief stations where there are steam generating appliances. In the older part of New York, in Greenwich-street, there is a battery of forty-eight Babcock & Wilcox boilers, each of 250 h.p., or 12,000 h.p. in all. In the fourth story of the building four additional boilers have recently been erected. The up-town building is designed to hold twelve boilers, but only six have yet been placed. These are of a capacity of from 200 h.p. to 250 h.p. The standard pressure of the company is 80 lbs. to 90 lbs. per square inch. The pipes of the down-town station extend through nearly five-and-a-half miles of streets, whilst the up-town pipes extend over two and one-third miles. The mains are of wrought-iron, and in some cases are as much as 16 in. in diameter, the metal being ¼ in. thick.

COMPETITIONS.

ART GALLERY, GLASGOW.—The architects selected by Mr. Waterhouse, R.A., to enter in the final competition for the building of the Glasgow Art Gallery are Messrs. John Honeyman and Keppie, of Glasgow; Messrs. Treadwell and Martin, of London; Mr. T. Manley Deane, of Dublin; Messrs. Malcolm Stark and Rowntree, of Glasgow; and Messrs. J. W. Simpson and E. J. Milner Allen, of London. Messrs. Honeyman and Keppie have two approved designs. The designs are now hung in the City-chambers. It is not intended to exhibit them in public until the final award has been made.

BOARD SCHOOLS, NORTHAMPTON. — There has just been a competition for new schools for the Northampton School Board, and the thirteen sets of plans sent in are now hanging in the Town-hall. Professor T. Roger Smith has reported on them.

OFFICES FOR POOR-LAW GUARDIANS, BRIGHTON. — The Parochial Offices Site Committee have submitted the following report to the Brighton Guardians:—"Your Committee report that they have received applications from twelve architects residing or practising in Brighton willing to prepare plans, specifications, and estimate for the erection of the proposed New Parochial Offices in Prince's-street, and, having carefully considered the same, they recommend that Messrs. Nunn & Hunt, of 129, Queen's-road, Brighton, be appointed as architects on the following terms, viz.:—If the cost of the building does not exceed 5,000*l.*, their fee to be 2½ per cent. on the ultimate cost. If the cost of the building exceeds 5,000*l.*, their fee to be 2 per cent. on the ultimate cost. The foregoing terms are inclusive of the preparation of all necessary sketch plans."

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—At the meeting of this Society on the 21st inst., held at the Royal Institution, Colquitt-street, a second lecture was given by the Rev. F. F. Grensted, entitled "Egypt as a Home of Early Art." The paper was illustrated with oxy-hydrogen lantern views.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 17th inst. in the hall, 42, George-street, Edinburgh, Mr. John Kinross, President, in the chair. Mr. James Bruce, W.S., moved:—"That this Association, as taking a deep interest in the careful preservation of the ancient buildings of Scotland, particularly of those in and near Edinburgh, has observed with great satisfaction that the Most Honourable the Marquis of Lothian, Secretary for Scotland, has recently been personally present at an examination of the present condition of the Royal Palace of Linlithgow, which has been in a roofless state since the fire of 1746; that the Association feels that the buildings of the Palace are presently in a critical state, and expresses a hope that without delay such steps will be taken by Government as will prevent the further internal decay of the Palace through exposure to the weather, and remove the immediate risk of the masonry falling, and thereby causing serious destruction to the remainder of the fabric." In submitting his motion, Mr. Bruce spoke of the dilapidated conditian of certain parts of the Palace, and of the great loss which Scottish historical and architectural art would sustain if means were not taken to preserve the structure.—Mr. Thomas Ross, in seconding the motion, stated that the present state of the Palace was simply deplorable from a historical and architectural point of view. The motion was unanimously adopted, and it was agreed to forward copies of it to the First Commissioner of her Majesty's Works, to the Secretary for Scotland, and to the Lord Advocate.—Mr. G. S. Aitken gave notice of the following motion:—"That this Association, in view of the recent architectural changes on the approach to the Register House, is of opinion that the Wellington Statue in front thereof should be removed, and that for the following reasons, viz.:—1. It is an obstruction to the thoroughfare; 2. It is out of scale with Adam's fine building; 3. It is incongruous with its surroundings; 4. Its merits as a work of art are not advantageously displayed in its present situation."—Mr. J. M. Gray, Curator of the Scottish National Gallery, afterwards read a paper on "Sir Henry Raeburn and Portraiture in Scotland." Having pointed out the historical value of portraiture, Mr. Gray remarked that in Scotland the usual sources of portraiture were sepulchral slabs and brasses, illuminated manuscripts, and coins, and sometimes charters. Dealing specifically with painted portraiture, Mr. Gray described as one of the first great examples, splendid as a specimen of religious and art portraiture alike, the altar-piece of Trinity College Church, Edinburgh, now preserved in Holyrood,—one of the finest examples of early Flemish art in Britain, and certainly by far the finest in Scotland. Then Mr. Gray treated of the portraiture of Queen Mary's time, taking particular note of portraits of the ill-fated Queen herself. There was no doubt, he concluded, as to what Queen Mary was really like, though as most of the artists who portrayed her were comparatively poor painters, we did not realise the beauty and loveliness attributed to her, but had, as it were, a map of her features. Mr. Gray next directed attention to some of the leading Scottish portraitists of succeeding centuries, giving particular notice to George Jamesone, William Aikman, and Allan Ramsay the younger, until he came to Raeburn, the Scottish portraitist, in whose best work they found almost at its highest the purely æsthetic value that came from technique, from the masterly use of material, and one in whom they found this purely sensuous charm united to the very utmost value of record. No other Scottish portrait painter was worthy to stand by his side. The only other Scottish artist fit to be named in the same breath was a *genre* painter, David Wilkie.—On the motion of Dr. Marshall, Rector of the High School, seconded by Mr. James Orrock, R.I., London, Mr. Gray was cordially thanked for his paper.

THE SOCIETY OF ENGINEERS.

THE thirty-seventh annual general meeting of the Society of Engineers was held on the 14th inst., at the rooms of the Society, 17, Victoria-street, Westminster, S.W. The chair was occupied by Mr. William Newby Colam, President. The following gentlemen were duly elected by ballot, as the Council and Officers for 1892, viz.:—As President, Mr. Joseph William Wilson, Junr.; as Vice-Presidents, Messrs. William Andrew Valon, George A. Goodwin, and Chris. Anderson; as other Members of Council, Messrs. R. W. Peregrine Birch, Charles Claude Carpenter, Henry Faija, Charles Gandon, Charles Nicholson Lailey, Thomas Bell Lightfoot, William George Peirce, and Arthur Rigg; as Hon. Secretary and Treasurer, Mr. Alfred Williams; as Hon. Auditor, Mr. Alfred Lass (Messrs. A. Lass & Co.). The proceedings were terminated by a vote of thanks to the President, Council, and Officers for 1891, which was duly acknowledged by the President.

The annual dinner of the Society was given at the Holborn Restaurant on Wednesday, December 16. The President, Mr. W. N. Colam, occupied the chair, and amongst a large company present were the Right Hon. Sir Lyon Playfair, K.C.B., M.P., Sir Robert Rawlinson, K.C.B., and Mr. W. H. M. Christie, M.A., F.R.S. (Hon. Members), General Webber, C.B., Mr. T. de Courcy Meade (President of the Incorporated Association of Municipal and County Engineers), Mr. W. Worby Beaumont, Mr. J. W. Wilson, jun. (President-elect), Mr. W. A. Valon (Vice-President), Mr. Henry Adams, Mr. Jabez Church, Mr. Chas Gandon, Mr. Perry F. Nursey, and Mr. A. T. Walmisley (Past-Presidents), Mr. Chris. Anderson, Mr. R. W. Peregrine Birch, and Mr. H. Faija (Members of Council), Mr. Alfred Williams (Hon. Secretary and Treasurer), and Mr. G. A. Pryce Cuxson (Secretary). The loyal and patriotic toasts usual on such occasions having been proposed and duly honoured, the toast of the evening, "Success to the Society of Engineers," was proposed and coupled with the names of the President, the Hon. Secretary and Treasurer, and the Secretary. The President, in the course of his reply, said he thought that the ever-increasing success of the Society of Engineers was mainly due, firstly, to the care which was bestowed in the selection of papers read, and the opportunities given to the younger members of the profession to take part in the discussion; secondly, to the summer visits of members to works of engineering interest, at which opinions are freely exchanged with great mutual benefit; thirdly, to the Hon. Secretary and Treasurer, Mr. Alfred Williams, whose long experience, common sense, and watchfulness were invaluable; and fourthly, to the energy and tact of the Secretary, Mr. Pryce Cuxson. During the last year, he was glad to be able to say, the increase of membership had been about 8 per cent., and the attendance at meetings about 5 per cent. The visits during the past summer vacation had been very popular, as evinced by the unusually large attendances. He felt he could hardly too strongly impress upon the minds of the younger members the importance of attending such meetings, or thank sufficiently those who, in the past, had given the members the privilege of adding to their experience in such a practical, pleasant, and healthful manner. The vacancy amongst their Honorary Members, occasioned by the lamented death of Earl Granville, had been filled by the election of Sir George Barclay Bruce, who regretted his inability to attend the dinner.

Other toasts followed.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

THE Lecture Theatre of the Crystal Palace Company's School of Practical Engineering was well filled on Saturday afternoon last, on the occasion of the annual presentation of certificates. Sir Robert Rawlinson, Vice-President of the Institution of Civil Engineers, presided.

The reports of the principal examiners, Mr. Percy J. Ogle and Mr. G. A. Goodwin, were read by the secretary, and were of a highly satisfactory character. Mr. Ogle stated that the average efficiency of the mechanical students was more than maintained; and Mr. G. A. Goodwin said, with regard to the civil engineering students, that the results of the examination had been phenomenal, and reflected great credit on both teachers and taught.

Sir R. Rawlinson, in the course of an address to the students, remarked (according to the *Morning Post*) that young men nowadays were fortunate in having much greater facilities for acquiring engineering knowledge than existed when he was a boy. There was in his young days no such school as that of the Cyrstal Palace, and he did not think there was any such master as Mr. J. W. Wilson. Engineering was not a novel profession. In one sense it was a very ancient one, although it was new in some of its aspects. The Egyptians produced great engineers; the Greeks were architects, sculptors, and engineers, and the Romans excelled as road-makers. Another form of engineering,—that of Gothic architecture,—rose upon the ruins of the Roman Empire. The President of the Royal Academy had extolled Gothic architecture as something almost superhuman. He (Sir R. Rawlinson), as a mason, had come to the conclusion that florid Gothic in stone was an impossible art, as Nature had not produced any stone which could resist atmospheric influences for any length of time after being subjected to the cutting and undercutting which was necessary in florid Gothic architecture. Engineering

had been revived in this country within a very recent period, and the first works of importance had been the canals. Of course, the canals were very useful, but the best of them were insignificant pieces of work as compared with the accomplishments of modern engineering. He was old enough to have been personally acquainted with the introducers of railways, which had practically diminished the diameter of the earth by one-third. The Romans had exceeded all preceding nations in the matter of water supply, but Great Britain had reached a perfection in its system of supplying water that was utterly unknown amongst the Romans; the great merit of our system, when at its best, being that we provide every house in our great cities with a constant service of pure water, instead of merely supplying a certain number of public fountains from which the water had to be carried by the householders. In conclusion, Sir R. Rawlinson impressed upon those students who would exercise their profession in distant countries the importance of remembering that they carried the reputation of their country with them, and of so ordering their lives as to be a credit to themselves, to their teachers, to the religion they professed, and to the land of their birth.

The certificates were then distributed by the Chairman. Mr. G. T. Rait, on behalf of the Crystal Palace Company, thanked the examiners for their services, and brief addresses were delivered by Mr. Goodwin, Mr. Ogle, and Mr. Wilson.

Mr. Rhodes, on behalf of the directors of the Crystal Palace Company, expressed their indebtedness to Sir R. Rawlinson for his presence, and, after a brief reply from the Chairman, the proceedings terminated.

Illustrations.

THE RED DRAWING-ROOM, ASTON HALL.

ASTON HALL is a very large Late Elizabethan building, finished, if my memory serve me right, in 1645. It is a very fine example of the style,—red brick with stone quoins,—and contains about one hundred rooms. The room I have chosen for my sketch is a typical one, though not the best; most of the ceilings are decorated in "gesso," and the fireplaces, too, are very varied and beautiful. Two or three of the rooms are oak-panelled.

The Hall and about a fifth part of the grounds belong to the Birmingham Corporation, and are used for a museum and park. The boundary wall, of which only a small portion remains, was over two miles in length; there were several celebrated avenues, one of chestnut and another of sycamore, and others, all leading up to the Hall. The sycamore avenue was half a mile long, but very little of these avenues remain. The Hall is surrounded by a terrace, and the gardens were prettily laid out in the olden time, and are so now. The plan is an E, with very large stabling, and several lodges. The whole, from any point of view, forms a very pretty and beautiful sketch; all the lines are good ones. A. E. Hewitt.

JAPANESE FLORAL ORNAMENT.

The double panels of iris in our illustration are taken from the sides of a Japanese picnic-box in the possession of the Marquis Hachisuka, of Tokyo. The Japanese picnic-box is composed of a series of deep trays placed one on top of the other, in which are carried the rice and the other viands. They stand about 18 in. high, and are 10 in. square; for the nobility they are often made of the finest lacquer. The one from which we have taken the irises is of black lacquer, the flowers and water lines being in three or four tones of gold; the veining of the leaves is either left black, or, where the leaf is dull, is drawn in brighter gold. The two flowers which are given in outline are formed of plates of pure bright gold; the tiny square spots on the leaves are formed of the same material. The pattern is repeated on the other two sides of the box. F. T. P.

DESIGN FOR ORGAN-CASE.

This fine and free sketch for a carved organ-case is by Mr. G. C. Horsley, and was exhibited at the last Royal Academy exhibition. The boldly-projected wings or consoles at the sides are not very constructive, perhaps, but form a strikingly original decorative feature, and serve to give breadth to the design.

COMPETITION DESIGN FOR WORCESTER VICTORIA INSTITUTE.

This design was one of the six submitted in the final competition, and was placed by Mr. Waterhouse, the assessor, first for architectural merit; it was ultimately rejected on account of the proposed buildings interfering with some adjoining owner's lights.

The authors are Messrs. Theo. Moore and W. Henry White, of 28, Finsbury-circus, E.C., and the drawings were exhibited in this year's Academy.

THE LONDON COUNTY COUNCIL.

A special meeting of this Council was held on Thursday, the 17th inst., just as we were going to press last week. Sir John Lubbock presided.

Allowances to Employés.—The Main Drainage Committee reported upon a letter received from the engineers at the Deptford pumping station, relative to the *employés* in a similar capacity at the Crossness, Abbey Mills, and Western pumping stations being allowed free residences, gas, and firing, the scale of wages being the same at all stations, and asking for similar privileges. The Committee recommended that a reply be returned to the effect that the Council have no intention of supplying cottages at Deptford, and pointing out that the houses and other emoluments are open to be obtained by any of their *employés* whose duties demand it; that the prospective advantage is one of many beneficial considerations, and that these would be administered, as vacancies occurred, by the committee, with a view to the encouragement of good public service.

The recommendation was agreed to.

Tooting Bec Common.—The Parks and Open Spaces Committee reported that they had from time to time had before them propositions for acquiring certain land, 3a. 1r. 36p. in extent, part of the Bedford-hill estate, which adjoined the western boundary of Tooting Bec-common, and on which there were a number of exceptionally beautiful trees. Those trees formed a background to the common, and if they were cut down one of the finest effects of the place would be gone. They first endeavoured to arrange an exchange of land, but the negotiations fell through. They were then approached by a deputation from residents in the locality, whom they informed that until some local effort was made to raise part of the money, they were not prepared to submit any recommendation to the Council. On October 30 last they received a letter stating that a sum of 1,800*l.* had been raised by public subscription, and on communicating that fact to the Wandsworth District Board they promised to contribute a sum of 1,676*l.*, thus providing half the purchase-money. The Committhe considered that the Council would be justified in contributing the remainder, and recommended that the Council should authorise an expenditure of 3,476*l.* for the purchase of 3a. 1r. 36p. of land to be added to Tooting Bec-common.

Mr. Beachcroft moved an amendment to refer the recommendation back, with an instruction that the Council could not contribute more than 500*l.* After a brief discussion, the amendment was negatived, 14 votes being given in its favour and 26 against.

Mr. Fardell proposed a further amendment, to the effect that the Council's contribution should not exceed 1,000*l.* Mr. Lloyd seconded this amendment, which was also rejected, as was also another amendment moved by Mr. Antrobus, seconded by Mr. Beachcroft,—"That a sum not exceeding one-quarter of the purchase-money be contributed by this Council."

The recommendation was then agreed to.

Improvement at Stoke Newington.—It was resolved that the Council should contribute one-half of the net cost of the proposed widening of Green-lanes, Albion-road, and Matthias-road, where those thoroughfares converged at Newington-green, on condition that such contribution did not exceed the sum of 3,025*l.* The Committee reported that the local authorities have agreed to share in the cost.

Proposed Morgue near Charing-Cross.—The Sanitary and Special Purposes Committee reported recommending

"That it be referred to the Public Health and Housing Committee to consider and report if it be practicable to provide a mortuary for unidentified bodies in connexion with any local mortuary and coroner's court near Charing-cross."

Mr. Westacott moved an amendment, which was agreed to, referring the subject to the Committee named to consider whether it was necessary, and, if so, practicable, to establish a morgue near to Charing-cross.

Bars and Gates.—The two following resolutions were carried, on the motion of Mr. Lloyd:—

"That it be an instruction to the Highways Committee to consider as to recommending the Council to apply to Parliament for power to remove the gates and bars in Radnor-street and Sussex-gardens, in the parish of Paddington."

"That it is to the public interest and advantage that the streets known as Harley-street and Portland-place, in the parish of Marylebone, should be opened for all kinds of vehicular traffic, and that it be referred to the Local Government and Taxation Committee to report in whom and by what authority the gates are now vested and controlled, and by what statutes, and particularly how far section 71 of 53 Geo. III., cap. 121, (entitled an Act for making a more convenient communication from Marylebone-park and the northern parts of the metropolis to Charing-cross) is still in force, which prohibits the passage of stage coaches, mail coaches, hearses, waggons, carts, drays, or other vehicles for the carriage of goods, merchandise, manure, soil, or other articles, or oxen, cows, or sheep in any drove or droves through the said streets, and also such part of the said section as requires gates to be maintained at the entrance of these streets, and porters to be appointed to attend these gates by day and night."

[We are indebted for the foregoing part of this report to the *Metropolitan.*]

At the ordinary weekly meeting of the Council, held on Tuesday last, Sir John Lubbock in the chair, nearly the whole sitting was occupied by licensing business.

Appointment of a new Chief Officer of the Fire Brigade.—The General Purposes Committee presented the following report on the subject of appointing a successor to Captain Sir E. M. Shaw, resigned:—

"We have to report that, in accordance with the directions given by the Council on November 3, an advertisement was issued inviting applications for the appointment of Chief Officer of the Fire Brigade. The applications were referred in the first instance to the Fire Brigade Committee, with a request from us that that Committee would submit to us the names of at least three candidates whom they considered the most suitable for the post. The total number of applications received was 41, and, of this number, nine were selected by the Fire Brigade Committee for a personal interview. The result was that the Committee submitted to us the following names, in order of preference,—

1. Mr. J. S. Simonds.
2. Captain W. P. Campbell.
3. { Commander E. B. Fletcher, R.N.
   { Captain C. J. Fox.

Having seen the four selected candidates, and weighed their respective merits and qualifications, we now submit to the Council the names of three of them in the following order—Captain William Pitcairn Campbell, Mr. James Sexton Simonds, Captain Charles James Fox. We recommend—

'That Captain William Pitcairn Campbell be appointed Chief Officer of the Fire Brigade, at a salary of 800*l.* a year, with quarters, coal and gas, upon the following conditions!—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of the office, and be not allowed to take any private business; that any fees received by him either as a witness or in any other capacity be paid to the Council; that no fixed allowance be made to him for travelling expenses, but that he be repaid any such expenses as he may actually incur; and, further, that during the summer vacation leave of absence not exceeding one month be allowed to him.'"

Mr. Lyon, Chairman of the Fire Brigade Committee, moved the following amendment:—

"That Mr. James Sexton Simonds, the Second Officer of the Fire Brigade, be appointed Chief Officer, on the terms and conditions set forth in the recommendation."

The Fire Brigade Committee, he said, had carefully considered forty-one applications, and when the names were put to the vote 10 out of 11 members voted for Mr. Simonds. There was thus practical unanimity on the part of the Committee in favour of the present Second Officer. That gentleman had done the work well during the past three months, and the largest individual ratepayer concerned,—if he might so speak of the fire insurance companies of London,—had written a special and urgent letter to the Chairman of the Council recommending Mr. Simonds for the post. He had had eleven years' experience of the London Fire Brigade, and no one else who had applied had any special knowledge with regard to the work of the London firemen. He favoured Mr. Simond's appointment, further, on the ground of carrying out the principle of promotion. And it would please the men.

Mr. Moss seconded the amendment, which was carried on a show of hands by 46 votes to 11.

Mr. Simonds was therefore elected.

The Proposed Amendment of the Metropolitan Building Act.—The Building Act Committee presented the following special report on suggested amendments of the law relating to Metropolitan Buildings:—

"The reference to the Building Act Committee empowers it to report from time to time to the Council as to the desirability of amending the Metropolitan Building Acts with a view to preventing the use of improper materials and construction, and generally upon the said Acts or any of them. Moreover the Council passed resolutions on April 6 and November 12, 1889, instructing the Committee to report on the measures necessary to check what is known as 'Jerry' buildings; and on December 8, 1891, a resolution asking the Committee to report as to the desirability of giving effect to the recommendation made in 1885 by the Royal Commission on the Housing of the Working Classes with regard to limiting the height of dwelling-houses according to the space about them, whether built on old or new foundations.

A Sub-Committee was appointed as long ago as May 1, 1889, to deal with the whole subject.

As regards District Surveyors and new by-laws, regulating the substances of which mortar is to be made, and other matters, the Building Act Committee has already reported.

In the course of three years' work, the Committee has frequently found itself hampered by deficiencies or ambiguities in the present law. While its legal proceedings have been in the large majority of cases successful, they have from time to time failed, and in other cases the Committee have been constrained to do nothing, in consequence of the doubtful state of the law. More especially your Committee has been impressed by its powerlessness to prevent the erection of buildings in too close proximity in proportion to their height, so as to result in conditions that cannot fail to be very prejudicial to the health of their occupants. In this respect London is now in a worse position than the rest of the country, and its local law is notably behind the by-laws of the large manufacturing towns. The Act of 1855, with all its imperfections, has conferred immense benefits upon London, but it is now quite out of date; in many points on which it should speak with emphasis it is silent; on the other hand, it sometimes interferes where interference is unnecessary.

In 1874 the Metropolitan Board of Works prepared with great care a Bill re-casting the Building Acts and embodying portions of the Local Management Acts. This Bill was introduced into Parliament, passed its second reading in the Commons, and was referred to a Select Committee, but in consequence of strong opposition it was withdrawn.

The Sub-Committee considered it to be their first duty to carefully examine the provisions of this Bill. This proved to be a heavy task, and the large amount of routine work thrown upon the Committee caused the progress to be very slow.

The Sub-Committee decided to recommend for adoption certain provisions of this Bill, which was in many respects a great improvent upon the Act of 1855, especially as regards clearness of expression; but as the Sub-Committee did not approve of the general form of the Bill, they decided to frame a new one themselves.

A few months ago the Committee learned that it was the intention of the Government to introduce a Bill to consolidate the Metropolitan Building Acts. The Sub-Committee thereupon decided to confine their attention to the simpler work of preparing suggestions for the Council to submit to the Government with a view to their embodiment in an Amending Bill, as was done in the case of the Housing of the Working Classes and Public Health legislation of 1889 and 1890.

On August 20 last the Building Act Committee received from the Local Government Board a copy of the Draft Consolidation Bill, with a covering letter asking for comments on the same. This they reported on in due course.

On December 10 another letter came from the Board stating that they would be pleased to consider any amendments to the law submitted by the Council.

It was somewhat difficult to recast the draft proposals of the Sub-Committee in the requisite form, and this caused further delay in this report. It was most desirable that the amendments submitted should, if approved by the Council, be placed in the hands of the Local Government Board at a very early date, so that their officials may have time to examine them and set the draughtsman to work before Parliament meets. If this session be lost, a new Council will have to deal with the matter, and three years' hard work will be lost.

The amendments are mostly of a high technical character, and are not likely to be opposed by any except those desirous of executing bad building. The Chairman of the Committee has prepared a memorandum explaining the nature and object of the more important proposals. Copies of the Consolidation Bill are placed in the library for reference.

The Committee do not urge the Council to endorse definite clauses to be inserted in a Bill to be promoted by the Council and supported by expert evidence before a Select Committee, but merely to authorise the Building Act Committee to make suggestions to the Local Government Board, with a view to their embodiment in a Government Bill which will be reported upon in due course.

They therefore recommend:—

'That the Council do express a general approval of the suggested amendments to the Metropolitan Building and Local Management Acts, and authorise the Building Act Committee to lay them before the President of the Local Government Board, and to confer with him as to any other amendments which may appear desirable during the progress of the Bill, and report the result to the Council from time to time.'"

The discussion of this report was not reached when, shortly after 8 o'clock, the Council was counted out, but a resolution had previously been passed adjourning the consideration of business which had not been disposed of till Wednesday afternoon.

Books.

Electricity up to Date for Light, Power, and Traction. By JOHN B. VERITY, M.Inst.E.E. London and New York: Frederick Warne & Co. November, 1891.

WHEN electric lighting was still in its infancy, Messrs. B. Verity & Sons, with commendable foresight, gave special attention to the subject of electric light fittings, and house-wiring, with the result that the firm now takes a leading place in that department of an extensive and growing trade. Naturally then, on taking up Mr. J. B. Verity's book, we turned with pleased expectation to the chapter on house-wiring feeling sure that we should find there valuable advice as to fittings, estimates of cost of wiring, &c., hints what to do, where to go, and what to avoid—in fact, the various details that an expert can so easily give, and of which the writer of a text-book knows nothing. Never were we so disappointed. "Conductors," "Insulation," "Fuses," "Wall Attachments," "Switches," &c., such are the headings of the various paragraphs. We are told that copper is the best conductor, except silver; and vulcanised india-rubber the best insulator; what a switch is, and what a wall-plug; in fact, just the things that a text-book writer would tell us, and nothing more. Mr. Verity's science is a little better than that of the average popular writer, but still is not quite "up to date"; this is, perhaps, of little consequence, for the book is not intended for students, but for the "general reader" who wants to know something of "the sources and capabilities of electricity"; for his information, also, a glossary is provided, which is, on the whole, fairly accurate. A few useful hints are given to those who possess, or contemplate the erection of, private institutions, and the book is illustrated throughout with plates, most of which seem to have been taken from the advertisement pages of the technical papers. Such information as Mr. Verity deigns to give us is conveyed in clear and readable language, and, except for an occasional slip, probably due to hasty writing, there is little fault to be found with the style. With an unknown name on the title-page, we should regard the work as a creditable piece of book-making; from Mr. Verity we expected something better, and can only regret an opportunity missed.

Text-Book on the Steam-Engine. By T. M. GOODEVE, M.A. 11th edition. London: Crosby Lockwood & Son. 1891.

THE fact that eleven editions of the above work have been published is sufficient evidence that the clear and thorough manner in which the author treats his subject is much appreciated. The present edition has been considerably enlarged by a supplement on gas-engines, and a chapter on the theory of heat engines has also been added, which renders the work one of the most complete text-books on the subject yet produced.

Mechanics for Young Beginners. By J. G. EASTON, M.A. London: Cassell & Co. 1891.

THE above work has been written chiefly for students preparing for the London Matriculation, the Preliminary Medical, and similar examinations. The subjects dealt with have been so treated that no mathematics beyond Euclid's geometry, and algebra up to quadratic equations, is necessary, except in a few instances, where the most elementary trigonometry is made use of. The book throughout is carefully written, and well suited to the class of students for whom it has been prepared. It contains a large number of examples at the close of each chapter, the solution of which is given at the end of the volume.

The General Machinist. By various Practical Machinists. London: Ward, Lock, & Co. 1891.

THE above book forms one of a series intended for the instruction of home students who are interested in industrial and technical work. The first portion of the work is devoted to a number of articles which are evidently intended to educate and prepare the mind for the descriptions of the various mechanical devices now in ordinary use. Some of the most important details of machinery are explained, and fully illustrated by diagrams and drawings, and many practical hints are given throughout the book which should prove of value to students studying the elements of machine design.

The Post Office London Directory, 1892. London: Kelly & Co., Great Queen-street. W.C.

THIS is the ninety-third annual issue of Kelly's Post Office London Directory, and, as usual, the corrections are brought down to the latest date. As examples, it may be mentioned that the new Commission of Lieutenancy for London, gazetted November 27, is given in the "City Directory," pp. 2539 and 2540; and the name of Mr. Alfred Haggis, the late Deputy-Chairman of the London County Council, whose death was announced November 25, is taken out of the "Official," p. 109, and from the "Official Index," p. 27. As we devoted some space to a notice of the "Directory" last year, it is unnecessary to say more now than that the work fully maintains all its old excellences, with some new ones super-added. Among the "improvements," however, we are not quite able to include the apparently growing tendency to interlard the "Commercial" and "Trades'" Directories with blocks. With regard to the map, we notice that, in attempting to correct an error which we pointed out last year, instead of the name of the new park at Camberwell being given as "Myatt's Fields," as it should be, it has somehow (probably owing to the indistinct handwriting of instructions to the engraver) become "Ingalls Fields." Next year, perhaps, we may hope to see the correction corrected. In the meantime, the Directory will be a welcome aid in every office.

Clarke's Pocket-book "for Plumbers, Architects, and Sanitary Engineers" (R. T. Bush London), is perhaps hardly a requisite for architects, who are thus handed down to a place after the plumbers, but it is a very useful pocket-book in regard to plumbing and sanitary work, and is of so small a size as to be a real "pocket-book" which can be carried without inconvenience.

Among Christmas numbers of weekly journals *The Queen* produces a large and well-illustrated number, from the popular point of view; the chromo-lithograph called "Love's Secret" is a pretty figure of its type. The number includes a double page of "Suggestions for Artistic and Decorative Work," among which are two pretty sketches of bas-reliefs of child subjects, but there is little in the other "suggestions" that is really artistic in feeling, however well intended.

The Christmas Number of the *Gardeners' Magazine* (London: 4, Ave Maria-lane) includes articles on "Hatfield House and its Gardens," and on "A Ramble through Stratford-on-Avon." A coloured picture of a flower garden in Autumn, with an almanack for 1892, is given as a supplement.

Yule-Tide, which is the title of Cassell's Christmas Annual for this year, gives its readers two graceful chromolithograph figures illustrating the saying, "My mother bids me bind my hair," and the usual "seasonable" pictures "The Waits," and so on; but the sketches in illustration of a story by Mr. Clark Russell, which occupies the whole number, are very clever indeed, and as far as artistic ability goes, are worth more than any of the large engravings. They are signed "W. H. O." Why the artist should not have the credit of his work by name we cannot see; his sketches are a great deal better in their way than Mr. Clark Russell's story.

ALMANACKS AND DIARIES FOR 1892.

"The British Almanac and Companion" (London: Published by the Stationers' Company), includes, besides the astronomical and kindred information for which it is noted, a useful list of Acts of Parliament passed in the last Session, with abstracts of the more important ones. It also contains what appears to be a careful digest of the condition and trade of foreign countries and the Colonies, but in its "Obituary" it omits to mention the death of John D. Sedding, although Mr. R. Langton Cole, in his review of "Architecture in 1890-91," in the "Companion," refers to it. Mr. Cole, of course, refers to the much-vexed question, "Architecture: a profession or an art?" he comes to the conclusion that it is both. Mr. Cosmo Monkhouse reviews "The Art of the Year," observing that "there have been no 'great signs' in the artistic sky of 1890-91." Mr. J. S. Shedlock discourses of "Engineering in 1890-91," and Mr. E. W. Maunder on "Science of the Year."

As usual, Messrs. Hudson & Kearns, of 83, Southwark-street, have sent us a parcel of their admirable diaries and blotting-pads for the coming year. Their "Architect's Diary," No. 12, contains, besides the calendar, postal information, &c., a great variety of matter which will be found especially useful to architects, surveyors, and civil engineers. The regulations of the London County Council regarding the construction of theatres and music-halls and the means of ingress and egress, are given; then follows a list of the seventy-four District Surveyors and their offices and districts. A useful feature is the *résumé* by Mr. Joseph A. Shearwood, barrister-at-law, of cases decided in the superior courts during the legal year from November, 1890, to August, 1891. We miss from the table of cases, however, that of "Cutler *v.* North"; it was probably not included because not involving any new point of law. The schedule of Professional Practice and Charges of Architects, sanctioned by the Royal Institute of British Architects, is printed in the Diary by, we are told, special permission of the Institute; then follow extracts from the Weights and Measures Act, 1878, tables of foreign moneys (with their equivalents in English currency), sizes of writing and drawing-papers, interest tables, lists of officers of architectural and kindred societies, a list of the Statutes of 1891, an alphabetical index to the principal practical Statutes, income-tax tables, a list of stamp duties, the Rules of the Supreme Court, June, 1891, and a variety of other useful information. Preceding the Diary is a lettered index, and the Diary itself provides a numbered page for each working day, with columns for appointments and details of business transacted. Then, after some blank leaves for "Notes," comes a "Rent and Fire Insurance Register," and, finally, a large number of ruled pages for use as a "Cash-book." "The Architect's Diary," No. 13, contains all the information, and all the features we have already mentioned as contained in No. 12, but with two pages of the Diary allotted to each working day. "The Builders' Diary," No. 11, issued by the same publishers, is on the same lines, and is specially designed for the use of builders and contractors. It contains, besides nearly all the information contained in "The Architects' Diary," a variety of estimating and other tables, with notes on materials, on checking estimates by cubing, &c., besides a large number of calculating tables. All these diaries are highly commendable both for their contents and the excellence of their get-up, and, as in former years, we can heartily recommend them to the notice of our professional and technical readers. To the general reader we may commend the same publishers' "Diary and Note-Book," No. 9, which, while containing all the ordinarily useful information, includes some of that contained in the before-mentioned diaries, and is equal to them in style and get-up. Messrs. Hudson & Kearns's registered "Date-indicating Pad and Book Diary" combined is sent to us in several forms. No. 4, which folds into a space about 11 in. by 9 in., is very convenient for use when travelling; it includes blotting-pad, indexed book-diary, and date-slip. No. 6, for the desk, includes pad, diary, and date-slip; No. 7 is a larger size of the same; while Nos. 8 and 8a are still larger, having at the top left-hand corner a washable space for standing memoranda and on the right hand side memoranda slips which are detachable when done with. All these pads are exceedingly useful and handy.

"Whitaker's Almanack" (London: J. Whitaker & Sons, Warwick-lane) has some of its sections enlarged. Additional space has been allotted to educational matters, and a separate article dealing with educational progress and occurrences is given for the first time. Agricultural education also forms the subject of a separate article. An article on our present Ocean Mail supplies a convenient record of the rise, progress, and best achievements of the great lines of ocean steamers. Naval gunnery and a synopsis of the results of the Census are also amongst the subjects separately treated. The Editor tells us that he has found it annually more difficult to omit any portion of the contents which has once appeared for the purpose of finding room for fresh articles. "Readers accustomed to consult the almanack for information on various subjects resent the omission when they find the usual place of what they required filled with something else. If, however, various sections of the work are similar in subject to those of previous years, they are for the most part entirely fresh in substance." The Editor adds that every page and nearly every line has been corrected. Like the other almanack previously mentioned, it omits to mention in its "Obituary" the death of so notable an architect as Sedding. Nevertheless, it is an exceedingly valuable work of reference, and is well indexed.

From Messrs. W. H. & L. Collingridge (*City Press* Office, Aldersgate-street, we have received "The City Diary and Almanack," which, besides being convenient in form and size, contains much information specially appertaining to the Corporation of London and to City institutions. This is its twenty-ninth year of its publication.

"The Railway Diary and Officials' Directory" (London: McCorquodale & Co., Limited) is a very useful annual, containing, as it does, a great deal of authoritative information as to traffic returns, accounts, dividends, lists of directors, officials, &c. "The Railway Almanack," issued by the same publishers, is a useful sheet of information.

"Calvert's Mechanics' Almanack and Workshop Companion (London: John Heywood) makes its nineteenth appearance, and is a useful miscellany of information for artisans and handicraftsmen.

Messrs. Chubb & Sons, of lock and safe celebrity, have sent us a neatly got-up pocket diary and almanack.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURE AND THE INSTITUTE.

SIR,—While thanking you for the candid review you give, in your issue of December 19, of my address to the Architectural Association, may I beg the favour of a short space in your columns to explain one or two points on which I apparently failed to make my meaning clear?

You object to my remark "that construction, planning, and choice of materials are not architecture, but that they are the foundation of it." You say that the plan is not merely the foundation of, but an integral part of the art of architecture. This is exactly what I said subsequently: that architecture is not a quality that can be added to construction, but a ruling motive that must govern the construction itself. I believe there is no real difference between us. Taken by themselves,—taken as they are, for instance by the engineer,—construction and planning are not architecture. But though construction does not amount to architecture, I was particularly careful to insist that architecture *includes* construction and planning. This was, in fact, the key-note of my address.

Later on, I defined a properly-written specification as a letter to the workmen to explain thoroughly beforehand all the methods of doing the work. This you suggest leaves out the question and necessity of binding the contractor. How so? Surely the best way of binding him is to describe as minutely as possible how everything is to be done, what materials and appliances are to used, where such and such things are to be got, and, in fact, to forestall all questions and ambiguity in the work. The ideal perfection of a specification is, in my opinion, that it should leave no room for questions and require no further explanation, and I will defy any contractor to play fast and loose with such a document.

Coming to the question of the surveyor-architect, that hybrid personage of whom you think it unreasonable and impracticable that we —"the memorialists" as you call us*,—should want to get rid, I do not think that any of our critics have fairly met our objections. Let me say first that no one can more distinctly repudiate than we do the idea that an architect has nothing to do with laying-out estates and planning streets or arranging gardens. On the contrary, this has always seemed to me one of the most enjoyable branches of our work. On this, we are thoroughly at one with you. But this is not surveying in the sense we refer to. It is notorious that many gentlemen who call themselves architects spend the best hours of their life in valuing land, letting it on ground leases, floating building schemes, which, be it observed, has nothing to do with laying out the ground; or else they sit on arbitration cases and decide questions of light and air, and other legal points; all of which have as much connexion with architecture as they have with theology. When these gentlemen call themselves architects as well, we can only say that either they or we are much mistaken in our conception of the requirements architecture makes on those who aspire to excel in it. If we are right in thinking that architecture is an art, and makes just the same demands as painting and sculpture on the time and energies of those who pursue it, then it is obvious that those who spend the best of their time in matters more fit for lawyers and commission agents and only the remnant of it on architecture, can never hope to do anything for the advancement of our art.

If, on the other hand, they are right, and art can be successfully pursued in the intervals of commerce, it is clear that we who think it requires the devotion of our whole life have been living in a dream.

This hybrid profession, however, is recognised by the Institute; half its members, I am informed, or thereabouts, describe themselves in the Directory as architects and surveyors, and consequently take a radically opposite view of architecture from the "memorialists," as I will call them for want of a better name.

Of what use, then, is the reiteration of the invitation so constantly pressed upon those of us who do not belong to the Institute to come in and join ourselves to it? We consider that the separation of surveying, in the sense I have defined, from architecture lies at the very beginning of all reform, and you invite us to join a body which recognises their union. We consider that the pretence of examination and issuing certificates of proficiency in art, is delusive and misleading, and a hindrance to artistic education, and you invite us to join a body which declares that its charter forbids it to reopen the question whether such examinations are desirable or not.

Without in the least questioning the sincerity and good intentions of the Royal Institute of British Architects, we cannot but see that their policy is framed rather so as to form their members into a close professional caste, comfortably hedged around with barriers of privilege and monopoly, than to do anything whatever towards raising the general standard of the art of architecture.

T. G. JACKSON.

14, *Buckingham-street*,
December 18.

SIR,—I spent Sunday evening in reading Mr. Jackson's paper. I thought that a few words from one who had passed the Examination might not be amiss. I am a provincial man, for which please excuse. Heaven knows how I decided to become an architect, but one summer-day I found myself on a leather-topped stool in an office occupied by my master and myself. I faithfully lighted his fire, copied his letters, and trotted his errands for five long years, and I thought that was the way architects "growed." Intelligence has been dawning upon me slowly, but when I sought dollars in exchange for my sparse capacity I found some difficulty. It struck me that I had been "off the rails," so I went to somebody as an "improver," wore a shabby coat, and half-starved myself. I was determined, however, to learn something this time. Aimless study would have been my ruin. There were none to guide or instruct, when suddenly, like a meteor, flashed forth the Institute Examination.

Here was the way. I devoured the "instructions." I studied the books recommended. I had got "on the rails," and my brain was afire. Here was the secret: there the goal. I worked night and day as I had never worked before. I went hundreds of miles—to London—and passed

* Mr. R. T. Blomfield adopted that expression, we merely repeated it from him.—ED.

with credit. I was proud. From that day all was well. The incentive to study had been given me. I knew better now how an architect was made. The lessons I learned previous to that examination, the method it taught me, the guidance it was, cannot be stated in words. I do not believe that my case is at all an isolated but a fairly typical one. Yet Mr. Jackson tells me that this examination is "but a hindrance and a distraction!" I hold that it will be the lode-star of thousands. It was an incalculable blessing to me.

I could say a good deal more, especially about the "memorialists" from a provincial point of view, but fear your patience and space is already exhausted, so simply subscribe myself

EPICTETUS.

SIR,—My roughly-worded speech at the Architectural Association was made, I am afraid, in forgetfulness of reporters. You dealt with it so kindly in your leader of last week, that I am induced to ask a line or two—not to unsay anything, but to supplement what your report—and I daresay my words—left barely intelligible.

My contention was that building construction was no great mystery; that the name of science was misapplied to what was after all mere common sense and honest handiwork; and that too much was made of it as a bugbear to impress the student and hoodwink the public.

There is a science of construction, perhaps, belonging to modern engineering. But if, as you no doubt rightly say, the Forth Bridge is its product, whereas Mediæval cathedrals came into being in innocence of it, is not the deduction this—that excellence in such a science should disqualify rather than distinguish the architectural student?

However, taking engineering and architecture on the same footing, the mischief is that we have lost the knack or habit of making the things we use beautiful. In other centuries than the nineteenth beauty came naturally to both, without distinction of what was engineering and what was building of other kinds. But then, in those times, they had not the sciences we have. We have changed this all. Running everything into one mould, we have now our sciences of construction, proportion, sanitation, and what not.

Modern engineering has the merit at least of letting its construction go unabashed in its scientific contortion. But when we build houses and churches, this same construction is not thought decent without a mask. You oall this mask scientific architecture. The President of the Institute favours one in the fashion of those of the old Athenian comedy, three faces together, with a side, artistic, scientific, or professional, to turn to the public at all points. But is not this judicious make-up an imposture, when put beside the real architecture, which was construction itself, necessarily beautiful from the art of the workman? Is it not an imposture, degrading alike to the public, who have been so easily cajoled, and to the men who on the pretence of it call themselves architects?

Fifteen years ago the *Quarterly Review* pointed out how architects nowadays were in the position of Cicero's Augurs, who must needs laugh when they meet. I gather from Professor Kerr that the Institute is of value to educate us in the *aplomb* necessary to maintain our gravity. One is out of place there if one cannot decently keep one's countenance. I accordingly appreciate the humour of your remark, that it was just as well that none of the wicked public were present at our A.A. meeting to note our indiscretions.

But to be more serious. As Mr. Jackson so finely put it, it were well for the Architectural Association, in passing into a new course, to consider well what "artistic life" is and what "artistic death," and to which of these it is that the Institute Examinations are the portal.

EDWARD S. PRIOR.

December 21, 1891.

ART *VERSUS* UGLINESS.

SIR,—In the daily journals it was lately chronicled that the theatrical world of London had made the Prince of Wales a present of a gold cigar-box in token of respect and admiration. This box or casket, strange to say, was utterly destitute of ornamental design, being a mere square-formed box, its only attribute of value being its material. Could a stranger or stronger want of taste and judgment be possibly shown? To a prince the mere money value of the metal would be of little consequence; the donors should have made the gift a work of art, as well as heart, so that it should be worthy of exhibition and preservation on its own account, and that the recipient might take pleasure in its beauty, valuing it for that reason as well as for the good nature of the donors. If one-half the amount of gold had been used in the manufacture, and the other half spent on artistic workmanship, the value of the thing might have been ten times greater. It was not as though the box was a genuinely useful thing; the real "practical" cigar-box was inside of wood, and the gold case,—from its weight, the awkwardness of handling it, from its perfect smoothness and lack of projections, as well as for the value of the metal,—was really not at all appropriate for its purpose, so far as usefulness was concerned. In spite of its costliness, it may be truly said to be neither useful or ornamental, and was quite unworthy the acceptance of a man of refinement and taste.

This is very much on a par with the wretched tasteless work common to goldsmiths at the present time, a horseshoe being their highest achievement and stock pattern wherever they can use it, though ugly and inappropriate, and disreputable from the silly, vulgar superstition connected with it. For tiaras they have but one idea,—a star. For bracelets, a snake, or that abomination, the "plain, solid gold," so highly esteemed by the uneducated plutocracy. Within the last twenty or thirty years there has been much progress and improvement in taste and design in all other trades save that of the goldsmith. He is as bad as can be,—ignorant and hopeless. In the British Museum are exquisite specimens of antique goldsmiths' art, perfect in design and execution, the value of the jewellery being in the art, not the material, the which is minimised as much as possible. Could not the Goldsmiths' Company direct study in this direction, and remove from us a standing national disgrace?

The City Freedom caskets, by the way, though costly, leave much to be desired. The last,—a Gothic one,—was very faulty in detail. The strong confidence of the City goldsmiths is in coats-of-arms, the enamelling giving a showy appearance. Shields-of-arms are their sole dependence.

Another matter I beg to say a word upon. New coinage is in progress, it seems. It is a pity the designs are not publicly exhibited, so as by general criticism to avoid the manifest and manifold faults of the last attempt. I should hope frippery of costume would be avoided, and the "image and superscription" be more boldly given, so that we may not so soon get smooth pieces of metal instead of decipherable coins.

P. E. M.

ROOD-LOFTS AND SCREENS.

SIR,—I have been greatly interested in the article by "C. F. Y." in the issue of November 28 (page 400, *ante*), and as there seems to be a good deal of debateable matter respecting them, I should be glad to find that still further information is to be forthcoming. It does not seem to be quite clear whether *every* church had formerly a rood-screen, or whether the greater part of them were first introduced at the period to which the bulk of the remains now existing undoubtedly belong. In nearly all the churches I have visited in Devon and Cornwall, where any of these structures remain, it is usually only the screen proper that is left, without any gallery or rood-loft over. The absence of this feature is accounted for, as "C. F. Y." says, by the fact of their removal during the reign of Edward VI. A point on which I desire information, however, is the legality of the authority under which that removal, where it took place, was effected. The statement is, that Archbishop Parker and Bishop Grindal issued orders for the demolition of all the galleries of church screens. This was distinctly affirmed in a paragraph on page 604 of the *Church in the West* (May 30, 1891), referring to the restoration of the great screen at Staverton, and the addition to it of a rood-loft.

In a succeeding issue of that paper, the correctness of that statement was questioned, and it was assumed that if the removal of the rood-galleries of pre-Edwardian screens was the result of directions given by due and legal authority, such a re-erection as that at Staverton could hardly be legal at the present day. As confirming "C. F. Y.'s" remarks on screens proper that they appear not to have suffered at the same time, one can point to such an instance as that of St. Peter's, Tiverton, where the side screens remained at the date of Lysons's History, viz., 1822, while at present there is no trace of them. The same is the case with St. Andrew's Church, Plymouth, where it is matter of record that the old screen was removed when the church was restored (?) in 1826. That there was not any puritanical objection to the screen as a separation between the chancel and the nave may be assumed from an instance quoted in Brandon's "Parish Churches," p. 103, where it is stated that at St. Mary the Virgin, Wigenhall, Norfolk: "The old puritanical arrangement of the chancel remains unaltered, the Communion-table being brought out into the middle and seats carried all round, and yet an entire and perfect rood-screen, with doors, was added in 1626."

There is also the further problem of how any galleries at all escaped the general demolition.

There are, of course, many instances, and I recently visited a church which contains a rood gallery and screen, apparently in no degree altered from its condition at the time when it was erected. I refer to Collumpton. There are, of course, no figures upon or above the rood-loft, but across the chancel stretches a highly-coloured and richly-carved beam, from which no doubt the rood originally depended.

The screen and gallery stretches across the whole width of the church, which has nave and side aisles, and there are also beautifully-carved parclose screens separating the chancel from the chancel aisles.

These are of oak, left without colour or gilding; but the main screen is richly carved, painted, and gilded, as is the under side of the gallery over, which on the upper part has a width of from 7 ft. to 8 ft.

I have hitherto searched in vain for any proper description of this church in any of the county histories, nor can I find that either the church or its magnificent screen has been photographed.

I should, therefore, be glad to learn where any proper description of the church may be found, and particularly whence any picture of its remarkable interior features can be obtained.

I should like also to ascertain whether a photograph of the screen at Manaton Church can be procured?

This, in some of its features, is said to be unique, and is now about to be restored, no doubt judiciously, as the work is to be carried out by Messrs. Rashleigh, Pinwell, & Co., under the supervision of Mr. Sedding.

I trust that some of your readers may be able to give some further information on this very interesting subject.

W. S. B. H.

THE STUDY OF CONSTRUCTION.

SIR,—In the very interesting paper by Mr. William H. White which you published in your issue of the 12th inst., he lays great stress on the study of construction as a science.

I should be much obliged if you would advise me through your columns as to the best introductory books on this subject. Books on "Building Construction" seem to be of little scientific use.

I should not venture to trouble you if I did not think that there might be others like myself to whom the information would be serviceable.

AN ARCHITECT'S PUPIL.

*** We may recommend to our correspondent the four volumes of "Notes on Building Construction" published by Rivingtons; Col. Seddon's "Builder's Work;" Rankine's "Manual of Applied Mechanics;" Tarn's "Science of Building;" Tredgold's "Carpentry."

The Student's Column.

MARBLES.—XXVI.

AMERICAN MARBLES.

THE chief marble-producing area in the United States is in Vermont; the East Dorset quarries have been longest worked, operations there having commenced as early as 1785, when the product was utilised principally for fire-jams, chimney-backs, hearths, and lintels. In 1838 the West Rutland quarries, in the same State, came into existence. The marbles of Vermont have been divided by Professor Hitchcock* into four groups, viz., (1) the common white and bluish, or Eolian marble, so called from its extensive development on Mount Eolus; (2) the Winooski; (3) the variegated, of Plymouth; and (4) the dark, almost black, of Isle La Motte. The beds of the first-mentioned group vary in thickness from a few inches to 6 ft. or 8 ft., the thickest usually being found where the marble is coarse-grained and friable. The colour of the stone varies in the different quarries from a pure white to light-blue, green, mottled and veined, and black; as a rule, the marbles are fine-grained in texture. The Dorset, West Rutland, Sutherland Falls (Proctor), Pittsford, and Brandon are a few of the more noteworthy quarries along this horizon. The following typical section of the marble beds at one of

* "Geology of Vermont," vol. II., p. 752.

the West Rutland quarries is given by the authority mentioned :—

	ft.	in.
1. Upper blue layer	4	0
2. Upper white layer	3	6
3. Grey limestone	5	0
4. White statuary	3	0
5. Striped layer	1	8
6. New white layer	4	0
7. Wedged white layer ... 8 in. to	2	6
8. Muddy layer	4	0
9. Striped green	4	0
10. "Camphor gum" layer	3	0
11. White layer	9	0
12. Blue layer	3	6

These different beds stand at a high angle. In quarrying, the best are selected, and excavations are made along the upturned edges; the worthless material is blasted, but the finer blocks are urged away from the parent rocks by channeling, drilling, and wedging. The white saccharoid varieties at West Rutland, as at Pittsford, have been used to a certain extent for statuary purposes, but none of the Vermont white marbles are so rich in tone as those from Carrara. The second group, or Winooski marble, is dolomitic in character, mottled red and white; some kinds are brecciated, and, as a rule, are very hard to work. The stone does not weather satisfactorily. The principal quarries are at St. Albans, Burlington, Colchester, and Swanton. That from the last-mentioned locality is grey, with pink tints. The third group of Vermont marbles,—the Plymouth,—is a pure dolomite. Quarries were opened in this district about the year 1835, but were subsequently abandoned. The stone is blue or bluish-brown in tint. The fourth group, the Isle La Motte marble, occurs abundantly in the island of that name in Lake Champlain, and other islands and the mainland in the vicinity. The material, which is largely used for flooring-tiles, has a black base, with white fossils scattered throughout.

The principal marble-working centre in Vermont is at Proctor; hydraulic-power is largely used, one company alone employing it to the extent of 2,500 horse-power, which is transmitted by the use of 75 horse-power air compressors in which air is submitted to a pressure of 60 lbs. to the square inch, and carried in long lines of pipe to the various points of application. By the use of arc and incandescent lights work is carried on through the night. A pneumatic tool for carving exists at one of the mills.

The following are analyses of two varieties of marble from Proctor, quoted in the eleventh census returns :—

	Dark-coloured marble.	Light-coloured marble.
Carbonate of lime	98·370	96·300
,, of magnesia	·790	3·060
,, of iron	·034	·053
Oxides of manganese and aluminium	·005	—
Matter insoluble in acids	·630	·630
Organic matter	·080	·004
	99·909	100·047

The stone weighs from 170 lbs. to 180 lbs. per cubic foot.

Pennsylvania marble is chiefly raised in Montgomery county, from quarries near Conshohocken and King of Prussia. The stone is white, or light blue, in colour, and is frequently veined or mottled. Prior to the introduction of increased facilities for transport of marble from other States, this material was extensively employed in the better class of buildings in Philadelphia. A fine black variety also occurs in the vicinity of Williamsport, Lycoming county.

New York marbles are quarried principally in the counties of St. Lawrence, Westchester, Columbia, and Warren. The material from the first-mentioned county varies from white to dark blue and green, and mixtures of these shades, producing a mottled appearance. It is said to be too coarsely crystalline for fine carving, scroll work, or tracing, and weighs 174 lbs. per cubic foot, with a crushing strength of 12,000 lbs. to the inch. The dolomitic marble from Westchester is not used very extensively for ornamental purposes; but at two or three places in Columbia county, a shell marble of a dull brownish colour is excavated. Warren county marble is black, and is generally used for tiling and the like.

Tennessee furnishes some of the finest and most beautiful tints of coloured marbles at present raised in the United States. Mr. Geo. P. Merrill, in his recent text-book,* states that at the present time the most extensive quarries are situated in Knox and Hawkins counties. The prevailing colours found there are chocolate, red, and white, often coarsely variegated and fossiliferous, though finely and evenly crystalline varieties of a pink or strawberry colour, with hardly a trace of fossil remains, also occur. They take a beautiful polish, and much resemble in appearance the Rosso de Levanto from Spezia, or the Persian fiorito. The thickness of the marble beds at Knoxville, Knox county, is some 300 ft. The most highly-esteemed variety from these quarries is brownish-red, with white spots and clouds, due to fossil corals and crinoids. The stone, both from these and the Hawkins quarries, is exceedingly strong and heavy, weighing 180 lbs. per cubic foot. The marble of the latter county is found in Trenton and Nashville rocks, lying west of Rogersville; and the available beds are from 50 ft. to 300 ft. in thickness. Good decorative stones also occur in many other parts of the State. Although the commencement of the marble industry in Tennessee dates back to the introduction of the material for interior ornamental work in the Capitol at Washington, it must still be regarded as being in its infancy. The chief obstacle to its more rapid development has been the lack of facilities of transport. The eleventh census report states that so great is the difference in the purposes to which the marbles of this State and Vermont are respectively put, that the industries cannot be regarded as strictly in competition, an increase in demand for the marble in one State producing comparatively little effect in a contrary direction upon the other.

Georgia marble is mainly raised from a belt of stone which is said to extend through the counties of Cherokee, Pickens, Gilmer, and Fannin. The chief centre is Tate, in Pickens county. There are several varieties,— pure white, blue, pink, rose, and dark green prevail. The stones are nearly pure carbonate of lime, and have a crushing strength of from 10,642 to 12,078 lbs. per square inch; whilst certain of them are practically non-absorbent.

Maryland marbles are quarried, notably at some localities about sixteen miles north of Baltimore, in rocks of Silurian age. They are white dolomites of medium texture, and have been largely employed in neighbouring cities. The stone occurs in immense horizontal masses, and blocks 28 ft. by 10 ft. by 3 ft. have been got out entire. Mr. Merrill states that the only true conglomerate, or breccia marble, that has ever been utilised to any extent in the United States, is found near Point of Rocks, Frederick county, in this State. The stone is of Triassic age, and is composed of rounded and angular fragments of different sizes, up to several inches in diameter, of quartz and magnesian limestone imbedded in a fine grey calcareous ground mass. The materials of which it is made being of such varying degrees of hardness, the stone is not very tractable in the hands of the mason, but it has a good effect when polished on the flat. Red, white, and grey are its prevailing tints.

In Massachusetts, crystalline limestones and dolomites have been worked in parts of Berkshire county, and the material was used in the Capitol at Washington, but the marble trade of this State is not very extensive.

Californian marbles have only recently come into notice; the majority are raised in San Bernardino county, and are utilised in the polished state principally for monumental purposes and tiling. The dolomite marble from Keeler, in Inyo county, weighs 178·5 lbs. per cubic ft., and is extremely non-absorptive.

The following statistics, referring to the year 1889, will give some idea of the marble industry of the United States :—

	Number of Quarries.	Cubic feet produced.	Total value in Dollars.	Number of persons employ'd.
California ..	4	33,792	87,030	62
Georgia	7	250,000	196,250	264
Maryland ..	3	333,305	139,816	206
New York ..	14	1,171,550	354,197	406
Tennessee ..	29	309,709	419,467	755
Vermont ..	36	1,068,305	2,169,560	2,716
Other States and Territories	10	153,552	121,850	120
Totals ..	103	3,320,213	3,488,170	4,529

The column showing the value of the marble produced gives the aggregate of the prices received at the quarries or mills by the individuals or firms working quarries. In other words, their value is what the producers receive for their output, whether rough or manufactured, eliminating all freight on the product sold. The figures in the column showing the number of men employed refer not only to those engaged in quarrying operations, but also all connected with mills operated by quarrymen. The statistics include also a few quarries producing serpentine.

Several other States produce marble of local interest, and the resources of the country generally are capable of much greater development in this respect.

Italian marble, principally Carrara, forms over three-fourths of the total imports of marble into the United States.

Canadian serpentines and some other ornamental stones from the Dominion have been incidentally alluded to in this series. The crystalline Laurentian limestone of Ontario produces marbles varying in colour from dull white, through shades of grey and green, to black, at Madoc, Hungerford, and other localities. At Renfrew, Arnprior, and Echo Lake, in the same province, good marbles also occur. Red marble, veined with white calcite, is found in Quebec, but, although the country contains an abundance of hard rock suitable for working up into handsome decorative stones, the marble trade of Canada and British Columbia is comparatively insignificant.

* "Stones for Building and Decoration." New York, 1891, p. 102.

GENERAL BUILDING NEWS.

New Offices, Bristol.—A large block of offices is now being erected at the St. Vincent's Ironworks, Bristol, for Messrs. John Lysaght, Limited, from the designs and under the superintendence of Mr. R. Milverton Drake, architect, Bristol. The frontage will be over 100 ft. in length, with a depth of 60 ft. Doulting stone will be used for the two main façades. The whole will be heated by hot water and lighted by electricity.

Wesleyan School Chapel, Holbeck, Leeds.—On the 8th inst. Sir James Kitson, Bart., laid the foundation-stone of a new Wesleyan School-Chapel at the Mint, Holbeck, Leeds. The new building, which has been designed by Mr. T. Butler Wilson, is to be erected in the English Renaissance style, and will be of brick, with stone dressings. It will contain an assembly hall, 50 ft. by 30 ft., with accommodation for 290 persons, and a gallery to seat seventy-two more. There will also be eight class-rooms. There will also be an infant school, and a tea-room. The heating apparatus will be placed in the basement. The total estimated cost of the building is 2,250*l*.

Board Schools, Bristol.—The new Board schools which have been erected in Cheese-lane, Bristol, to take the place of the old premises in Anvil-street, St. Philip's, were opened on the 7th inst. by Mr. Mark Whitwill. The site in Upper Cheese-lane, has a frontage to that thoroughfare of 190 ft. Upon this site schools have been erected to accommodate 639 scholars, from plans prepared by Messrs. Hansom & Bond, architects, Bristol. Cattybrook bricks, with terra-cotta facings, have been employed in the construction of the building. In the centre are a couple of class-rooms, flanked by two gabled projections of an ornamental character. The central hall is in the rear, the ceiling being supported by a Corinthian column. The exterior surface of the flat fireproof roof is asphalted. Surrounding this hall are eight class-rooms, with an additional large apartment for infants. The cost, including the site, will be over 11,000*l*.

Mission Hall, Birmingham.—A mission-hall, in Ellis-street, built by the congregation of the Church of St. Thomas, was opened on the 5th inst., by the Bishop of Coventry. The building comprises the hall, which will seat between 350 and 400 people, two entrance-porches, class-rooms or vestry, kitchen, store-room for chairs, heating-chamber, &c. The cost, including furniture, &c., has been about 1,300*l*. The architect is Mr. F. B. Osborn, and the builders Messrs. Hopkins & Son, of Birmingham.

Higher Grade School, Swansea.—On the 25th ult. the inscribed stone of the new higher grade school, the erection of which has been commenced by the Swansea School Board on the site of Russell House, Dynevor-place, was laid by Mr. John Roberts. The new school is being built from the designs of Mr. T. P. Martin, Swansea (which were accepted out of eleven sets of plans), by Messrs. Jenkins Brothers. The new building will be of polled stone, with Bath-stone dressings, and will have frontages to Dynevor-place and De-la-Beche-street. It will afford accommodation for 480 boys, and will be provided with a laboratory for technical instruction. The rooms in the new building will be distributed as follows:—Lower basement: Caretaker's-rooms, gymnasium, lava-

tory, two manual class-rooms, technical class-room, and heating-chamber and stoves. Ground floor: Board-room, clerk's office, general officers', clerk of works', inspector of schools' waiting-room (isolated from class-rooms, of which there are five), together with master's-room, with private entrance. First floor: Physical lecture-room, chemical laboratory, store-room for apparatus, two art class-rooms, and master's class-room. The corridors on each floor are 7 ft. wide, with corresponding staircase accommodation. The building is to have fire-proof floors.

ST. BARTHOLOMEW'S CHURCH, PORTHLEVEN.—This church has lately been re-opened, after having been closed for a year for repairs and additions. The work has been carried out under the direction of Mr. G. H. Fellowes Prynne, architect, London. The principal features of the design are the addition of a new baptistry and new vestry and organ-chamber, heating, the entire renewal of floor, reseating, new chancel-screen, choir-stalls, altar, and decoration of sanctuary. The baptistry is at the west end of the church. It is apsidal in form, having north and south entrances. The chancel is divided from the nave by a wrought-iron screen, carried out, from Mr. Prynne's design, by Messrs. John Singer & Sons, of Frome. The pulpit is designed to be in brass and iron; the choir-stalls, which are arranged in four rows on either side of the chancel, are of oak with carved ends, and were made by Mr. Harry Hems, of Exeter, who has also other work for the church in hand. The sanctuary arch and sanctuary are rich with gold and colour. The decoration has been carried out by Messrs. Fouracre & Son, of Plymouth, from the architect's design.

SEAMEN'S INSTITUTE, RUNCORN.—On the 10th inst. the new Seamen's Institute, which has been erected in Station-road, Runcorn, was opened by the Bishop of Chester (Dr. Jayne). The building is in the Gothic style, and was designed by Mr. John Wilson. There are two stories to the building, each of which is 30 ft. by 65 ft. The lower room will be used for purposes of recreation. The room above is intended for holding religious services. There is also a smaller room, which will be fitted up as a library.

NEW CHURCH, ASHTON-IN-MAKERFIELD, LANCASHIRE.—The foundation-stone of St. Thomas's new church, Ashton-in-Makerfield, was laid on the 5th inst. by Colonel Legh, of Lyme Park. The new church will be the third which has occupied the same site, and for the greater part will be built on the old foundations. The style which will be adopted in the rebuilding will be early sixteenth century. The whole of the works are being carried out at a cost of 5,000*l.* by Mr. Winnard, Wigan, from the designs of Mr. Oldham, F.R.I.B.A., Manchester.

NEW WESLEYAN SUNDAY SCHOOL, LEEDS.—On the 12th inst. a new Wesleyan Sunday School in Dewsbury-road, Leeds, was opened. The buildings consist of a central school or assembly room, 65 ft. long by 35 ft. wide, capable of seating 500 persons, with recessed platform at one end, and with open, timbered roof, 25 ft. high, to the ceiling. The room is lighted by large windows at each end, and by clearstory windows at the sides, filled in with tinted, leaded lights. Two entrances to the front are provided for boys and girls respectively, leading into lobbies with glazed screens and tiled floors. On either side of the assembly-room, and entered therefrom, are eight class rooms, of various sizes; also a church parlour, or ladies' work-room, 29 ft. long by 18 ft. wide, and 15 ft. high. At the rear of the school an infants' room, capable of accommodating 150, is placed, with raised gallery at one end, and provided with separate external entrance. In the basement, three additional class-rooms, kitchen, and apparatus-room, and all other necessary conveniences, are arranged. All of the class-rooms are fitted with electric bells. Fresh air is admitted by inlets and air-channels, and the vitiated air drawn out by exhaust air-shafts and ventilators. In addition to open fireplaces in several of the rooms, each room is warmed by the low pressure hot-water system. The building is of pressed bricks, with stone dressings. The interior woodwork is of pitch pine and varnished. The work has been carried out by Messrs. P. Rhodes, T. Harrod, and J. Lindley. Mr. G. F. Danby, of Leeds, was the architect.

THE TUBULAR LOCK.—The "Tubular Lock Syndicate" draw our attention to this lock, which was invented, and was noticed by us, some time ago, before it was in the hands of the present company. It is, however, a lock to which attention may well be called again, having great merits in regard to cheapness, adaptability of any one lock to either right or left hand doors, and in the fact that it leaves space above and below it for long screws for the attachment of the door-handles, instead of the short ones which must necessarily be used with the usual section of mortice lock. The stile is pierced for the lock by a centrebit working through an iron guide-tube temporarily fixed with flanges on the edge of the stile to guide the tool.

SANITARY AND ENGINEERING NEWS.

THE SEWERAGE OF MALDON, ESSEX.—At a meeting of the Sanitary Institute, on the 9th inst., a paper on "The Sewerage of the Town of Maldon, Essex, with some observations on recent practice in Sewer Ventilation," was read by Mr. Richard F. Grantham, M.Inst.C.E. The paper gave a description of the works recently completed. They include the laying of the main sewers, building of storage tanks, outfall sewer discharging into the estuary of the river Blackwater at certain times of the tide, and also the laying of the house connexions with traps, air-inlets, and ventilating-shafts. Maldon contains a population of about 5,500, occupying about 1,250 houses. Of these, about 1,000 houses have been connected with the new system of sewers, representing a population of about 4,500. The method of dealing with the house connexions, and with the sewers carried round at the backs of rows of houses, was described in detail. With regard to ventilation, the author pointed out that changes of opinion and practice had taken place within the last few years. The primary conditions for preventing the accumulation of foul air were: sufficient falls in the sewers, proportions to suit the expected volume of sewage, construction of the best kind, flushing where necessary, and as many openings into the outer air as practicable. Various plans, such as introducing trays of charcoal into the manholes and lamp-holes, had been tried for deodorising and purifying the sewer air before it escaped into the streets, but without permanent good effect. Tall shafts had a beneficial influence in the length of the sewers near them, but that influence was destroyed if there be many inlets into the sewers near the junction with the shafts. The direction of currents of air in sewers depended upon the force and direction of the wind. Numerous upcast shafts for ventilating the main sewers had been erected in Croydon, Hornsey, Twickenham, and Liverpool, and some had been fixed in the City of London, in Birmingham, West Hartlepool, Maldon, and in Willesden Parish. In some cases the street gratings had been closed, but in Hornsey, Croydon, and Maldon they were for the most part left open without causing any nuisance. It was therefore suggested that upcast shafts should in future form part of the designs of new systems of sewers. Seeing the increase in the practice of erecting upcast shafts, and their beneficial influence in preventing the stagnation of air in the sewers, and in view of the general adoption of the system of fixing similar pipes to house-drains, the author suggested that future investigations should be conducted with the object of amalgamating the two systems of pipe-shafts, and doing away with syphon traps in house-drains outside the houses.

HERTFORD SEWERAGE.—Major-General Phipps Carey, R.E., one of the inspectors of the Local Government Board, recently held a local inquiry upon an application of the Borough Authority to extend their boundary to take in Bengeo, containing a population of some 1,300, and outlying places. Local witnesses were called as to the insanitary condition of Bengeo, and as to the desirability of adding the district to Hertford.—The scientific witnesses called were:—Mr. Urban Smith, C.E., of Westminster, to show that Bengeo could be more advantageously sewered into the Hertford sewers than in any other manner, and at a reasonable cost; that the Hertford purification works were capable of dealing with the Bengeo sewage in addition to that from Hertford, and that the addition of the Bengeo sewage would not cause any injury to the River Lea.—Mr. Thomas Stevenson, of London, gave evidence as to the condition of the effluent from the Hertford works, and stated that in his opinion the addition of the Bengeo sewage would not make any material difference to its purity, or to that of the River Lea; and Dr. Turner, Medical Officer of Health, gave evidence on the same lines.—No formal opposition was offered to the proposed extension, but the Lea Conservancy Board and the East London Water Company were represented at the inquiry to watch the case, having regard to the fact that water for the supply of London is taken from the Lea below the outfall of the Hertford effluent.

HONLEY SEWAGE DISPOSAL.—The Local Board of Honley, in Yorkshire, have instructed Mr. W. H. Radford, C.E., of Nottingham, to prepare plans and superintend the construction of certain intercepting main sewers with sewage disposal works for the Township of Honley. A large amount of dye-water and manufacturers' refuse will have to be dealt with. The Local Board Surveyor, Mr. George Kaye, will prepare plans of the lateral sewers in the town and connect them to the intercepting sewers mentioned above.

GRAYS AND TILBURY SEWAGE DISPOSAL.—At a meeting of the Grays Local Board, held on the 10th inst., a deputation was received from the Orsett Guardians asking the Grays Local Board to receive the sewage from Tilbury and deal with it at their proposed new sewage disposal works. After discussion, it was agreed to receive and deal with the Tilbury sewage, subject to terms to be arranged afterwards. Tilbury will contribute an annual payment in proportion to population or volume of sewage. The chief terms necessary to form the basis of an agreement have been drawn out by the Engineers to the two Authorities. Mr. W. H. Radford, C.E., of Nottingham, is the Engineer for the new disposal works and sewers at Grays, and Mr. C. Jones, C.E., of Ealing, is the Engineer for the Tilbury sewers.

DRAINAGE SCHEME, LEICESTER.—The Local Government Board have just sanctioned a storm-outfall drainage scheme, estimated to cost 71,000*l.*, and the erection of two new refuse destructors, to cost 18,000*l.* (exclusive of site), which works have been designed by the Borough Engineer, Mr. E. G. Mawbey, C.E. The storm-outfall drainage scheme consists for the most part of a culvert down the valley of the Soar, some 3¾ miles long, with a diameter of 8 ft., and a discharging capacity of about 70,000,000 gallons per day, in order to give a free outfall into the river Soar for the main sewers of the town whenever the pumps are overpowered. We understand that these works will be proceeded with as soon as the contracts can be got out.

STAINED GLASS AND DECORATION

STAINED GLASS WINDOWS, ST. MARY'S CHURCH, HOLLINGWORTH.—Two stained-glass windows have just been placed in St. Mary's Church, Hollingworth, at the expense of Mr. George W. Rhodes, of Manchester, in memory of his mother. The windows have been supplied by Messrs. J. Thomason & Co., of Manchester.

STAINED GLASS WINDOW AT ST. JOHN'S CHURCH, CARDIFF.—On the 6th inst., at the Church of St. John the Baptist, Cardiff, a new stained-glass window was unveiled at the western end of the church. The window, which has for its subject Christ and the woman of Samaria, is the work of Messrs. Dixon, of London.

CHANCEL WINDOWS, ST. JOHN'S CHURCH, BRADFORD.—The four side chancel windows have now been filled with stained glass, forming, together with the large east window, a complete series of illustrations of the history of our Lord from his resurrection to ascension. All these chancel windows are by Messrs. Powell Brothers, of Leeds.

STAINED-GLASS WINDOW, ST. ANDREW'S CHURCH, YEADON.—The window by the pulpit has been filled with stained-glass, illustrating the event in the life of St. Andrew which directly led to his martyrdom, namely, his conversion to Christianity of Maximilla, the wife of a pro-consul Ægeus. The work is from the studio of Messrs. Powell Bros., of Leeds.

FOREIGN AND COLONIAL.

FRANCE.—M. Yves Guyot, the Minister of Public Instruction, has appointed M. Mayeux as chief architect for the École Normale Supérieure, M. Blavette for the Odéon National Theatre, and M. Camut for the work at the Ministry of Public Instruction.——The Cabinet Members of the Chamber of Deputies have requested the Minister of Public Instruction to place in the Casimir-Perier Saloon fonr bronze statues, of Berryer, Casimir-Perier, Ledru-Rollin, and Gambetta.——The idea of the proposed exhibition of the collected works of Meissonier next May has had to be abandoned, on account of unforeseen difficulties, and the Committee formed to promote it has dissolved, after sending a letter of thanks to all those who had promised to lend pictures.——It is intended shortly to form a physical and meteorological laboratory in the Eiffel Tower, to be arranged on successive stages of the tower, in order to study under the atmospheric conditions of various heights.—— An exhibition of photographs of the historic monuments of France is to be organised at the Trocadéro gallery.——Ninety-six artists have taken part in the competition opened by the Municipality of Paris for the decoration of the Salle des Banquets at Hôtel de Ville. The designs will be exhibited from Christmas Day to January 7. ——At the Ministry of Public Works a committee has been formed to study questions relative to the materials employed for the construction of concrete, artificial stone, &c. The committee includes several eminent architects, MM. Dutert, Garnier, Joly, Bouvard, and Vaudremer among others.—— A committee has been formed at Loudun to raise a monument there to Theophraste Renaudot, who was, in the seventeenth century, the founder of French journalism.——On the 15th there took place in the basilica of Fourvières, at Lyons, the "baptism" of the new carillon of fourteen bells. ——It is announced that in 1892 there will be an exhibition of fine art held at Nice; the date is not yet fixed.——An art exhibition is also to be held in April next year at Béziers, on the occasion of the inauguration of the monumental fountain by M. Injalbert. ——The death is announced of M. Tripier, chevalier of the Legion of Honour, and Professor of Anatomy at the École Nationale des Beaux-Arts.——The Parisian journals state that there has been discovered at Cherbourg an establishment for the manufacture of spurious

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered
*Draining of Cairo	Government of Egypt	200*l.*	Jan. 31
School Buildings	Penrith School Board	Not stated	Mar. 8

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
*Road Works	Beckenham Loc. Bd.	G. B. Canton	Dec. 28
Cast-Iron Pipes (43 tons)	Ashton-under-Lyne, Waterworks Com.	G. H. Hill	Dec. 29
*Road-making Works	Willesden Loc. Bd.	O. Claude Robson	do.
*Works and Materials	Corp. of Liverpool	*Official*	Dec. 31
*Cadets' Quarters, Woolwich	War Department	do.	do.
Gasholder and Tank	Alloa Gas Commrs.	do.	do.
Roads and Sewerage	Leicester Corp.	E. G. Mawbey	do.
Stone Work at Cemetery	Salford Corp.	*Official*	do.
Works at Rowditch Recreation Ground	Derby Corp.	R. J. Harrison	Jan. 1
*Goods Warehouse, Wicker, Sheffield	Midland Railway	*Official*	do.
Alterations and Improvements to Hotel, Camborne	The Redruth Brewery Co.	.....	Jan. 4
Drainage Culvert	Plymouth, Devonport, & E. Stonehouse, S.A.	J. L. Hodge	do.
*Concrete Paving	Wimbledon L. B.	*Official*	
*Sinking and Steining Two Trial Shafts	Buckingham U.S.A.	Baldwin Latham	do.
*Making-up and Repairing Roads	Fulham Vestry	W. Sykes	Jan. 5
*Station Improvements and Bridges over Railway and Stream, &c. Bridlington	North Eastern Rly.	H. Copperthwaite	do. Jan. 6

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
*Sewage Works	Fulham Vestry	T. P. Norrington	Jan. 6
*Iron Bridge over Railway, Hull	North Eastern Rly.	H. Copperthwaite	do.
*Strengthening Pier Head, Erecting Pavilion, &c.	Brighton West Pier Co.	R. W. P. Birch	Jan. 7
*Erection of Lock-up, Gt. Berkhamstead	Herts C. C. Standing Joint Com.	Urban A. Smith	do. do.
Service Reservoirs	Denby Local Board	G. & G. H. Crowther	do
Engineers' Workshop, Kingston, Halifax	.....	Jas. Farrar	Jan. 9
*Congregational Church Schools, Chichester	.....	E. J. Hamilton	Jan. 10
Residence, Colne, Wilts	Tom Harris	C. E. Davis	Jan. 11
Sewerage Works	Maldon U.R.S.A.	Alan Stewart	do.
*Repairing Road	Borough of Croydon	*Official*	Jan. 12
Iron and Steel, Timber, &c.	Manch. Ship Canal Co.	do.	No date.
Stable, Kirkstall-road, Leeds	A. McCarmick	C. T. Wilkinson	do.
Alterations to Houses, &c. and Erection of Shops, Offices, &c. Park-lane, Leeds	.....	J. Charles & Sons	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Foreman	Boro' of Leeds (Highways Dept.)	100*l.*	Dec. 29
*Engineering Assistant	Boro' of Plymouth	100*l.* rising to 140*l.*	Jan. 2
*Surveyor	Hendon U.R.S.A.	150*l.*	Jan. 11
*Architect and Surveyor	Worshipful Company of Cutlers	Not stated	Jan. 12
*Assistant Instructor in Geometrical Drawing	Royal Indian Engineering College	250*l.*	No dat

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., & viii. *Public Appointments, p.* xix.

paintings by Millet, which are sold as originals. A great many have been already produced.——The Society of Architects of the Lower Seine district have made a strong protest against the proposed demolition of the ancient church of St. Laurent at Rouen.——The demolition has been commenced of the Pompeian house designed by M. A. Normand for Prince Napoléon, in the Avenue Montaigne, Paris.

MISCELLANEOUS.

ROYAL INSTITUTION OF GREAT BRITAIN. — The Friday evening meetings before Easter include the following:—January 22, Lord Rayleigh on "The Composition of Water;" February 5, Professor Roberts-Austen on "Metals at High Temperatures;" February 12, Mr. G. J. Symons on "Rain, Snow, and Hail;" February 19, Professor Percy F. Frankland on "Micro-organisms in their relation to Chemical Change;" March 18, Mr. George du Maurier on "Modern Satire in Black and White;" April 1, Mr. F. T. Piggott on "Japanesque;" and on April 8, Professor W. E. Ayrton on "Electric Meters, Motors, and Money Matters." The lecture arrangements before Easter will include three lectures on "Some Aspects of Greek Sculpture in Relief," by Mr. A. S. Murray, keeper of Greek and Roman antiquities at the British Museum, on Thursday, January 21, 28, February 4.

STREET IMPROVEMENTS, SHEFFIELD.—Mr. Arnold Taylor, the Deputy Engineering Inspector of the Local Government Board, held an inquiry on the 8th inst. at the Town Clerk's Office, Sheffield, with respect to the application of the Corporation for the sanction of the Local Government Board to their borrowing 19,550*l.* for works of street improvements, viz., for Crookes Valley-road (in addition to the 12,000*l.* sanctioned in 1883), 5,000*l.*; for the purchase of land and widening of High-street (Walsh's corner), 6,450*l.*; for the purchase of land and widening Clarkehouse-road, 3,950*l.*; and for the purchase of land and widening of Gibraltar-street, 4,150*l.* The only persons who attended the inquiry besides the Inspector were the Town Clerk, the Borough Surveyor, and Mr. Ward (the Deputy Borough Surveyor). The two former officials gave details connected with the application. The Town Clerk and the Borough Surveyor, with the Inspector, afterwards took a tour of inspection of the various works in question. In order to save a future local inquiry the Inspector took notes of the money requirements of the Corporation in connection with that portion of the Westbar widening which immediately adjoins the Union Offices, for which the Corporation acquired a block of property for the sum of 8,000*l.*, and afterwards sold the surplus land for 5,100*l.*, thus leaving a balance of purchase-money of 2,990*l.*, which, with the estimated cost of street-widening, makes a sum of 3,100*l.* to borrow.

NEW SEA WALL AND PROMENADE, FILEY.—The Filey Local Board have, says the *Leeds Mercury*, adopted the final arrangements for the new sea wall and promenade. The Local Government Board has sanctioned a loan of 10,500*l.* for the purpose. The plans of Messrs. Fairbank & Sons, of Westminster, have been adopted. The sea wall and promenade, when completed, will extend from the Ravine to the southernmost point of Crescent-hill, a distance of 700 yards. The work is not solely undertaken as an attraction to the town, but for a distance of at least 400 yards to preserve the cliffs, which have been falling for several years. The work will be completed in two sections, and will be provided with three slipways, one at each end and one opposite the Spa Saloon. The wall will be faced with concreted blocks, behind which will be blocked stone, and behind this layer strong clay and made ground. It will rise to a height of 11 ft. above high-water mark ordinary spring tides, with the foundations carried well into the clay that underlies the beach. The top of the wall will be finished with an asphalted promenade 12 ft. wide, extending the whole length of the wall of 700 yards. An iron railing will surmount it, and behind the promenade will be a water channel, and in some places grass plots and open areas. In order to effect this a quantity of land will be reclaimed. It has now been decided to construct a concrete apron to the wall at a distance of 2 ft. 6 in. farther seawards.

PULPIT, ST. JOHN THE EVANGELIST, STAND.—A pulpit has been placed in the church of St. John the Evangelist, Stand, near Manchester, as a memorial of the late vicar, the Rev. W. D. Carter, M.A. It is of veined alabaster, with a base of Hopton Wood stone. Around the pulpit are three niches, with green marble shafts. Two of the niches contain tracery, and the centre one holds the figure of St. John, accompanied by his eagle, carved in white alabaster. The work has been carried out by Messrs. Earp & Hobbs, from the drawings and under the direction of Mr. J. Medland Taylor, the architect of the church.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—On the 19th inst. the students in the honours stage of building construction in the Glasgow and West of Scotland Technical College visited the sanitary show-room and warehouse of Messrs. T. B. Campbell & Son, of Glasgow. Explanations of the various appliances were given by Mr. Bennet, the manager; Mr. Low, teacher of plumbing; and Mr. Gourlay, the lecturer. At the close a vote of thanks was accorded the firm.

SANDRINGHAM HOUSE.—We understand that the floors at Sandringham, recently destroyed by fire, have been reconstructed on Messrs. Homan & Rodger's patent system.

CROWLAND ABBEY RESTORATION.—During the progress of the work of restoring Crowland Abbey, Lincolnshire, an interesting discovery has been made. The workmen were about to remove a decayed stone, to replace it with a sound one, when they discovered that the walls between the buttresses consisted of only thin casings of stone built over an older wall, which was completely covered with panelling similar to that on the interior of the west wall of the tower. A good portion of it has been laid bare, and will be undoubtedly preserved. The tower of this historic building has now been made safe from its very foundations, which have been underbuilt; while the spiral stairs, the bearing arches which carry the steeple, and the porch, with the King's chamber, are all secure. The preservation of the bell-chamber is about to be undertaken, with the necessary work for putting the fittings of the bells in a safe and workable condition. When this is accomplished, the Early English doorway into the nave is to be attended to.—*Leeds Mercury.*

THE EMPLOYÉS OF STEVEN BROS. & CO., the well-known firm of manufacturers of architectural and constructional ironwork, Upper Thames-street, on the 19th inst. held their annual dinner at the Freemasons' Tavern, Great Queen-street. Mr. Alexander Ritchie, C.C., presided. A very enjoyable evening was spent. The customary toasts were duly honoured, and the employés carried out an excellent programme of vocal and instrumental music. The toast of the visitors was very ably replied to by Mr. V. M. Navalkar, of the firm of Thos. Black & Co., plumbers and sanitary engineers, of Bombay, who is on a business-visit to England and Scotland. The toast of the parent firm, "McDowall, Steven, & Co., of Glasgow," was ably proposed by Mr. Muir, and not less ably responded to by Mr. J. Grimmond, a representative of the Glasgow house. The toast of the evening, "The President," was drunk with the utmost enthusiasm, and was replied to by Mr. Ritchie in a short speech. He expressed the hope that he might be present at these reunions for many years to come.

REMOVAL.—Mr. Edgar H. Selby, A.R.I.B.A., architect and surveyor, notifies that on January 1 he will remove from 26, Craven-street, to No. 8, Buckingham-street, Adelphi, W.C.

BIRMINGHAM ENGINEER STUDENTS.—A meeting of the Association of Birmingham Students of the Institution of Civil Engineers was held at the Midland Institute on Thursday evening last, when the President, Mr. J. Edward Willcox, A.M.Inst.C.E., delivered a lecture on "Details of Plumbing Work," which was illustrated by numerous diagrams. An interesting discussion followed.

A NEW LEAD-PAINT.—*Le Génie Civil* describes a method of making a lead-paint. About five litres of cotton-seed oil are placed in a suitable metal vessel, and into this is poured about ten kilogrammes of molten lead at a temperature of about 335 C. The lead is poured in slowly, a little at a time, and the mixture is kept constantly stirred. When the operation is complete and the oil has cooled down, it will be found that about 1½ kilogrammes will have been taken up and held in solution by the oil. The operation is then repeated as often as required; it being found that five litres of oil will take up about five kilogrammes of lead after five repetitions of the treatment. The result is a liquid about as thick as varnish, which will adhere very strongly to any materials, more especially metals, and is a valuable vehicle for protecting iron or steel against rust in sea-water.

PROJECTED NIGER RAILWAY.—Captain Brosselard Faidherbe has submitted a project for a railway from the coast to the navigable part of the Niger, starting from Maoundone, situated two hours' journey from the mouth of the Mellacoree, and which is, it is said, well suited for a naval station. The length of the railway would be nearly 200 miles.

RUSSIAN RAILWAYS.—It is stated that the Russian Minister of Finance has prepared a plan for the acquiring of the Southern Railways by the State, upon which the latter would obtain direct communication between the Baltic and the Black Seas.

COMMUNICATION BETWEEN SWEDEN AND THE CONTINENT.—By the completion of the steamer *Kronprinsesse Louise*, a novel kind of communication has been established between Sweden and Norway and the rest of the Continent. This vessel will carry six first-class carriages on deck, which, by an ingenious arrangement, are run on to the vessel direct from the railway track. Consequently, in future, first-class passengers may travel from Stockholm and Christiania to Copenhagen and further, or *vice versa*, without leaving the carriage. The ferry runs between Elsinore and Helsingborg. In order to facilitate this arrangement, a new railway-station,—said to be the finest in Denmark,—has been erected close to the shore at Elsinore, into which the railway-cars

are run. The journey between the Scandinavian capital and London will in future only occupy fifty-eight hours. It is intended to extend the ferry arrangement also to second-class passengers, and eventually to goods. A second vessel will shortly be taken in hand, to cost 18,000*l.* The entire cost of the improvements mentioned is about 200,000*l.*

THE SWEDISH IRON TRADE.—The Swedish imports and exports of coal, iron, and steel, and machinery during January-September, 1891, as compared with the same period of 1890, were as follows:—

IMPORTS.

	1891.	1890.
Coals and coke (hectolitres)	13,227,000	12,359,000
Machinery, &c.	£482,000	£590,000

EXPORTS.

	1891. Tons.	1890. Tons.
Pig iron	35,700	44,580
Bar iron	107,850	115,980
Castings	2,550	5,150
Blooms	7,234	8,420
Bar cuttings	840	2,770
Rod iron	2,750	3,250
Plates	2,600	4,460
Nails	1,860	1,630
Iron ore	122,360	137,550

There is, therefore, a falling off in this year's exports of nearly 25,000 tons, due to the small stocks on hand. There is but little activity in the Swedish iron markets, for the same reason, but prices are firm, present quotations being:—

	F.o.b. Gothenburg.	F.o.b. Stockholm.
Ordinary forged bars	£8 5 0	£8 2 6
Ordinary rolled ditto	7 15 0	7 12 6
Fine rolled ditto	8 5 0	8 2 6

The imports into this country of Swedish iron during August last were as follows: — Pig-iron, 5,690 tons; bar iron, 9,880 tons; castings, 215 tons; blooms, 580 tons; bar cuttings, 75 tons; rod iron, 230 tons; plates, 140 tons; nails, 125 tons. There is every prospect of an advance in the prices of Swedish iron and steel next year, owing to the smallness of the stocks on hand.

THE ZONE RAILWAY TRAFFIC IN HUNGARY.—The zone tariff having now been in force on the Hungarian State railways two years, the Hungarian Minister of Finance has issued a report upon its working, from which we learn that during these two years 21,000,000 more persons were carried than in the two preceding years. The gross earnings increased by 5,600,000 florins, whereas the expenditure only increased by 1,500,000 florins. However, in the near future, a large number of new locomotives and carriages has to be provided, 147 of the former having already been ordered at a cost of 7,000,000 florins. The Minister points out that such new rolling-stock would have been required in any case, there having for years been a great scarcity of the same on the Hungarian State lines.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

943.—IMPROVEMENTS IN TILES AND POTTERY: *H. L. Doulton and H. S. Leech.*—To form undercut projections and recesses in tiles and pottery, pieces or perforated sheets of indiarubber or elastic are pressed against the clay, from which such articles are made while the same is confined in the mould, or the mould has an elastic medium inserted for the same purpose.

933.—APPARATUS FOR PREVENTING BURSTING OF WATER-PIPES: *C. H. Coe*—According to this patent, a small brass cylinder, closed at one end, in which moves a piston acting on a metal spring, is fixed to the pipe. Increase of pressure from the water in the pipe moves the piston and compresses the spring, and relieves the pressure upon the pipe itself.

1,847.—DOOR-CHECK: *J. E. Mellor.*—This patent refers to what is stated to be an improvement on the American type of door-closer, with some mechanical details added to ensure the absolute efficiency of its work.

15,457.—FLUSHING TANKS: *C. Horton.*—This refers to an automatic tank having a lifting wheel and a valve fitted for the purpose of actuating and controlling the flow of water for flushing purposes.

15,581.—BORING BITS: *E. C. Phillips.*—The shank and cutter of the bit are separable, and an ordinary threaded and wood screw may be used as a screw-point. It is claimed that the device is particularly simple and effective in use for wood work.

17,238.—DOOR-FASTENINGS: *B. R. Baker.*—The fastening in this case is an automatic return bolt held in locked position by return stop-bolt controlled by a catch lever until pressure is applied.

17,466.—FIRE-PROOF FLOORS AND ROOFS: *T. A. Lea.*—According to this invention, artificial joints are composed of separate blocks with cavities, and tension rods are used in constructing floor or roof, or separate courses of fire-proof blocks are also built up to form the floor or roof.

NEW APPLICATIONS FOR LETTERS PATENT.

December 7.—21,356, E. Edwards, Saws.—21,367, A. Smith, Securing Doors and Windows from the inside.

December 8.—21,423, P. Jensen, Heating Buildings by means of Steam or Hot water.

December 9.—21,483, B. Peffard, Bricks to be used without Mortar.—21,494, T. Crump and others, A Supply Valve and Water-waste Preventer combined for use in Flushing Cisterns. — 21,503, E. Johnson, Drain-pipe Junctions.—21,520, T. Harries, Artificial Stone.—21,535, G. Andrews and W. Brown, Cramping Wood Framing.—21,542, A. Carter and H. Hughes, Stained Glass for Windows and other Transparencies and Mural Decoration.—21,576, H. Leigh, Multiple Saw-frames.

December 10.—21,586, P. Pusey, Water-closets.—21,589, W. Dawkes, Valves for Flushing Cisterns, superseding separate air-pipe and affording an after-flush.—21,613.—P. Walker, Ventilators.

December 11.—21,669, H. Woodcock, Flushing Cisterns for Water-closets.—21,674, T. Gawthorp, Sash-fastener —21,718, C. Major, Roofing Tiles.

December 12.—21,754, L. Sutcliffe, Holding Devices for Sliding Window-frames, &c.—21,763, J. Saunders, Opening and Closing Fanlights, &c.—21,779, E. Brook, Kilns.

PROVISIONAL SPECIFICATIONS ACCEPTED.

18,430, F. Cross, Stencil-plates.—19,182, W. Gleave, Earthenware Pipe-joints.—19,488, T. Coulthard, Door Locks, having a combined night-latch and bolt.—19,585, H. Brookfield, Flushing Water-closets, &c.—19,652, S. Johnson, Flushing Water-closets.—19,857, F. Lipscombe, Chimney-cowls and Cowls for Ventilating Shafts.—19,947, C Crosby, Preventing Down-draught in Chimney and other Shafts.—19,997, H. Crane, Siphon-flushing Cisterns and Water-waste Preventers.—20,160, G. Richmond and J. Wainwright, Fasteners for Doors and Windows. — 20,143. H. Wilson, Mitring-machines.—20,281, W. Stfin, Baker's Ovens.—20,740, J. Blakesley, Fire-proof Floors, &c.—20,743, J. Abell, Paving.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

J. Meburn, Apparatus to be fitted to Doors to prevent their Slamming or Swinging.—11,812, R. Dawe, Facilitating the Opening, Closing, Fastening, and Securing of Doors, &c.—17,389, R. Roderick, Gasaliers, &c.—19,498, F. Bates, Ratchet Tools.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 10.—By *Jenkins & Son* (at Deptford): 90, Lewisham High-rd., New Cross, u.t. 61 yrs., g.r. 8*l.*, r. 50*l.*, 420*l.*; 97 to 109 (odd), Lewisham High-rd., u.t. 38 yrs., g.r. 31*l.* 16s. 6d., r. 395*l.* 10s., 3,295*l.*; 111, Lewisham High-rd., u.t. 37 yrs., g.r. 5*l.*, r. 38*l.*, 380*l.*; 113 and 115, Lewisham High-rd., u.t. 36 yrs., g.r. 22*l.* 10s., 510*l.*; 188, Lewisham High-rd., u.t. 61 yrs., g.r. 12*l.*, 1,350*l.*; 137 to 143 (odd), Lewisham High-rd., u.t. 35 yrs., g.r. 24*l.*, r. 335*l.*, 3,460*l.*; 11 and 12, Amersham Park-rd., u.t. 41 yrs., g.r. 2*l.* 2s., r. 92*l.*, 740*l.*; 184, Malpas-rd., Brockley, u.t. 73 yrs., g.r. 5*l.*, r. 30*l.*, 360*l.*; 50, Brockley-rd., u.t. 37 yrs., g.r. 2*l.*, r. 30*l.*, 240*l.*; 120 to 126 (even), Brockley-rd., u.t. 69 yrs., g.r. 13*l.* 8s., 1,050*l.*; 87, Florence-rd., New Cross, u.t. 38 yrs.. g.r. 4*l.*, r. 28*l.*, 310*l.*; 2 to 5, Nile-st., Deptford, u.t. 49 yrs., g.r. 13*l.*, r. 133*l.* 8s., 600*l.*; 77, High-st., f., r. 60*l.*, 1,235*l.*; 46 and 48, Tanners-hill, with stabling in rear, f., r. 101*l.* 16s., 960*l.*

DECEMBER 14.—By *Messrs. Eilcart*: 35, Richmond-rd., Barnsbury, u.t. 50 yrs., g.r. 8*l.*, r. 42*l.*, 355*l.*; 26. 28, 42 to 48 (even), London-st., Islington, u.t. 42 yrs., g.r. 10*l.*, 1,060*l.*; 9, Sunderland-ter., Westbourne-pk., u.t. 57 yrs., g.r. 11*l.*, 500*l.* — By *Walker & Runtz*: 9 and 11, Rutland-st., Whitechapel, u.t. 16 yrs., g.r. 4*l.*, 270*l.*; 5, Oxford-st., u.t. 19 yrs., g.r. 2*l.* 15s., r. 26, 145*l.*; 14, Oxford-st., u.t. 15 yrs., g.r. 2*l.* 2s., r. 26*l.*, 160*l.*; 106, Ernest-st., Stepney, and 91, Skidmore-st., u.t. 25 yrs., g.r. 2*l.* 19s., 180*l.*; 56 and 58, Barnby-st., Stratford, u.t. 78 yrs., g.r. 7*l.*, 185*l.*—By *Hampton & Sons*: 37 and 39, St. James's-rd., Holloway, f., 1,120*l.*—By *P. Hodson*: 1, 2, and 3, St. James's-pl., Hanwell, f., r. 92*l.*, 980*l.*; 1, 2, 3, and 4, St. Leonards Villas, f., 755*l.*

DECEMBER 15.—By *C. E. Joy*: No. 485, Fulham-road, u.t. 62 yrs., g.r. 7*l.* 10s., 570*l.*

DECEMBER 16.—By *Thurgood & Martin*: l.g.r. of 84*l.*, u.t. 13 yrs., g.r. 16*l.*, Regent-sq., St. Pancras, 415*l.*; 131, Sloane-st. Chelsea, u.t. 5 yrs., g.r. 18*l.*, r. 150*l.*, 420*l.*; Francis-st., Westminster, l.g.r. of 55*l.*, u.t. 3 yrs., g.r. 6*l.* 6s., &c., 70*l.*; a plot of f. building land Bound's Green - rd., Wood Green, 250*l.*; "The Grange," Station-rd., and 3 a. 3 r. 20 p. f., 3,000*l.*; "Nightingale Hall," Bound's Green-rd., and 10a. 2r. 38p., f., 6,000*l.* By *W. & F. Houghton*: Cable-st., St. George's East, f.g.r. of 12*l.*, with reversion in 84 yrs., 245*l.*; A block of freehold building land, Deptford, 65*l.* By *J. A. Jones*: 13, Cambridge-ter., Belgravia, u.t. 47 yrs., g.r. 9*l.*, r. 50*l.*, 525*l.*; 5 and 6, Rutland-st., u.t. 33 yrs., g.r. 16*l.*, r. 85*l.*, 830*l.*; 25, Bessborough Gardens, u.t. 41 yrs., g.r. 10*l.*, r. 80*l.*, 650*l.*; 30, Graces-rd., Camberwell, u.t. 57 yrs., g.r. 7*l.* 7s., 270*l.* By *F. Jolly & Co.*: "Kenilworth," Bound's Green-rd., Wood-green, u.t. 89 yrs., g.r. 7*l.* 7s., r. 28*l.*, 300*l.*; 115, Brook-st., Ratcliff, u.t. 29 yrs., g.r. 10*l.*, r. 59*l.* 16s., 55*l.*; 2, Guernsey-villas, Leytonstone, f., r. 23*l.* 8s., 235*l.* —By *Blake & Dannatt*: 20 and 21, Woodland-grove, Greenwich, u.t. 46 yrs., g.r. 4*l.*, r. 28*l.* 12s., 170*l.*; 7, Rectory-grove, Woolwich, u.t. 24 yrs., g.r. 2*l.* 16s., r. 20*l.* 16s., 120*l.*; 15, Rectory-grove, u.t. 24 yrs., g.r. 2*l.* 16s., r. 20*l.* 16s., 135*l.*

DECEMBER 17.—By *Wood & Kirby*: 41, 43, and 45, Cardigan-rd., Bow, u.t. 75 yrs., g.r. 13*l.* 10s., r. 105*l.* 6s., 740*l.*; 43, 45, and 47, Glaskin-rd., Hackney, u.t. 64 yrs., g.r. 12*l.*, 800*l.*—By *H. J. Bliss & Sons*: "Sussex Lodge," Borough-rd., Norbiton, f., 700*l.*; a plot of freehold building land, Queen's-rd., 170*l.*; 10 and 11, Plough-alley, Wapping, f. sites, 75*l.*; 79, Green-st., Bethnal Green, f., 700*l.*; 2, 2A, and 3, Star-st.; and 78, Market-st., Paddington, u.t. 30 yrs., g.r. 15*l.* 15s., 1,400*l.*—By *Newbon & Co.*: 18 to 28 even, Stavordale-rd., Highbury, u.t. 85 yrs., g.r. 48*l.*, r. 228*l.*, 2,115*l.*; 53 and 55, Grosvenor-rd., Canonbury, u.t. 58 yrs., g.r. 16*l.* 18s., 995*l.*; 97, Grosvenor-rd., u.t. 58 yrs., g.r. 9*l.* 9s., r. 65*l.*, 530*l.*; 74, Dartmouth-pk-hill, Highgate, u.t. 69 yrs., g.r. 8*l.* 17s., r. 44*l.*, 325*l.*; 7, Bemerton-st., Caledonian-rd., u.t. 49 yrs., g.r. 6*l.*, r. 41*l.* 12s., 225*l.*; 117, Bemerton-st., u.t. 53 yrs., g.r. 6*l.*, r. 30*l.*, 215*l.*; 68, Henry-st., St. John's Wood, u.t. 25 yrs., g.r. 13*l.*, r. 40*l.*, 230*l.*; 19, Princes-sq., St. George's East, f., r. 28*l.*, 325*l.*; 45, Cloth-fair, Smithfield, f., r. 55*l.*, 1,100*l.*; 10 and 12, Ellerthorpe-st. Poplar, u.t. 52 yrs., g.r. 6*l.* 6s., r. 52*l.*, 295*l.*—By *Worsfold & Hayward* (At Dover): "Crabble Hill House," and a plot of land, f., Dover, Kent, 1,500*l.*

DECEMBER 18.—By *Toplis & Roberts*: No. 163, Regent-st., u.t. 28 yrs., g.r. 93*l.* 15s., r. 450*l.*, 4,970*l.*; 3, Conduit-st., u.t. 11 yrs., g.r. 150*l.*, r. 225*l.*, 620*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	9/0/0 0/0/0
Teak, E.I.	load	9/10/0 15/0/0
Sequoia, U.S.	ft.cu.	2/3 3/0
Ash, Canada	load	2/10/0 4/0/0
Birch, do.		3/0/0 4/5/0
Elm, do.		3/10/0 4/15/0
Fir, Dantsic, &c.		2/0/0 3/10/0
Oak, do.		2/10/0 4/10/0
Canada		5/0/0 7/0/0
Pine, Canada red		2/10/0 3/10/0
Do, yellow		2/10/0 5/0/0
Lath, D'ntsic,	fath	5/5/0 6/10/0
St. Petersburg		5/10/0 7/10/0
Deals, Finland, 2nd & 1st std		9/10/0 10/10/0
Do, 4th & 3rd		7/10/0 8/10/0
Do. Riga		6/10/0 8/0/0
St. Petersburg, 1st yellow		10/10/0 15/0/0
Do. 2nd yellow		8/10/0 10/0/0
Do. white		7/0/0 10/10/0
Swedish		7/15/0 16/0/0
White Sea		8/10/0 17/10/0
Canada, Pine 1st		19/10/0 25/10/0
Do. do. 2nd		14/10/0 16/10/0
Do. do. 3rd, &c.		6/10/0 10/10/0
Do. Spruce. 1st		8/10/0 11/0/0
Do. do. 3rd & 2nd		6/10/6 8/0/0
New Brunswick		7/0/0 7/10/0
Battens, all kinds		8/10/0 16/10/0
Flooring Boards, sq., 1 in. prep. 1st		0/8/6 0/14/6
Do. 2nd		0/7/6 0/11/6
Other qualities		0/5/3 0/8/0
Cedar, Cuba	ft.	/3½ /4½
Honduras, &c.		/3½ /4½
Mahogany, Cuba.		/4½ /6½
St. Domingo, cargo av		/4½ /6½
Mexican do. do		/4 /5
Tobasco do. do		/5½ /7
Honduras do.		/5½ /6½
Box, Turkey	ton	4/0/0 13/0/0
Rose, Rio		10/0/0 20/0/0
Bahia		9/0/0 18/0/0
Satin, St. Domingo	ft.	0/0/9 0/1/3

TIMBER (*continue*

Satin, Porto Rico		0/0/10 0/1/6
Walnut, Italian		0/0/3½ 0/0/7

METALS.

IRON—Pig, in Scotland	ton	2/7/3 2/7/6
Bar, Welsh, in London		6/0/0 6/2/6
Do. do. at works in Wales		5/10/0 5/12/6
Do. Staffordshire, in London		6/10/0 6/15/0
COPPER—British, cake and ingot		48/0/0 49/10/0
Best selected		49/0/0 50/0/0
Sheets, strong		58/0/0 59/0/0
Chili, bars		45/0/0 45/7/6
YELLOW METAL	lb.	0/0/5½ 0/0/5¾
LEAD—Pig, Spanish	ton	11/3/9 11/6/3
English, com. brands		11/5/0 11/7/6
Sheet, English, 3 lbs. per sq. ft. and upwards		13/5/6 0/0/0
Pipe		13/15/0 0/0/0
ZINC—English sheet	ton	26/0/0 0/0/0
Vieille Montagne		26/10/0 0/0/0
TIN—Straits		90/5/0 90/15/0
Australian		90/5/0 90/15/0
English Ingots		94/0/0 95/0/0

OILS.

Linseed	ton	19/0/0 19/5/0
Cocoanut, Cochin		26/15/0 0/0/0
Do. Ceylon		23/10/0 23/15/0
Palm, Lagos		23/0/0 24/0/0
Rapeseed, English pale		29/10/0 0/0/0
Do. brown		27/15/0 0/0/0
Cottonseed ref.		18/0/0 18/10/0
Oleine		0/0/0 0/0/0
Lubricating, U.S.		4/10/0 5/10/0
Do. refined		6/0/0 11/0/0
TAR—Stockholm	barrel	0/19/0 0/0/0
Archangel		0/12/6 0/0 0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BLACK NOTLEY (Essex).—For repairs and painting to Black Notley Hall. Mr. Rd. Mawhood, architect, Chelmsford:—
G. Holland, Gt. Leighs, Essex £527 15 0

BLACKPOOL.—For the construction of the "Eiffel Tower," to be erected in steel, approximate weight 1,500 tons in addition to the staircases, gates, and flagstaff as specified. Messrs. Maxwell & Tuke, architects, 29, Princess-street, Manchester:—
Heenan & Froude, Newton Heath, near Manchester £40,500 0 0

BROMLEY.—Accepted for the erection of a shop in High-street, Bromley, Kent, for Mr. D. Lavender. Mr. G. Warren Cooper, F.S.I., architect. Quantities by Mr. A. R. Brede:—
J. C. Arnaud & Sons, Bromley £1,562 0 0

BROOMFIELD (Essex).—For roof 120 ft. by 50 ft., to cover farm yard. Mr. Rd. Mawhood, architect, Chelmsford:—
J. Norrington £268 10 0
C. Choat & Son, Chelmsford (accepted) 245 0 0

GALMPTON (South Devon).—For additions to Greenway House, for Mr. T. B. Bolitho, M.P. Messrs. J. W. Rowell & Son, architects, Newton Abbot:—

Vanstone & Munsford	£950	Rundle Bros.	£926
C. & R. E. Drew	945	Wm. Mills	910
F. A. Stacey	935	Rabbich & Brown, Paignton*	897

* Accepted.

HALIFAX.—For the erection of bank premises, shop, and house, in Commercial-street, for the Lancashire and Yorkshire Bank, Limited. Messrs. Utley & Gray, architects, 10, Waterhouse-street, Halifax:—
Masons, &c.—William Sutcliffe, Sowerby Bridge
Carpenter and Joiner—Samuel Greenwood, Halifax
Slater and Plasterer—J. Bancroft & Sons, Halifax
Plumber, Glazier, and Gasfitter—J. Nayen & Son, Halifax
} £5,238 0 0

HAUXLEY and TOGSTON (Northumberland).—For the construction of a covered service reservoir, at Sturton Grange, and providing and laying eight miles of cast-iron pipes, for the Union Rural Sanitary Authority. Mr. Temple Wilson, Surveyor, Alnwick:—

J. Grantham	£1,838 0 0	R. Carse & Son	£3,225 0 0
J. M. Pearson	3,818 0 0	D. MacGregor	3,046 6 6
G. Thompson	3,763 10 0	T. Bell	2,999 9 9
T. Dixon	3,502 0 0	John Carrick, Durham (accepted)	2,876 0 0
Elliott & Nicholson	3,364 15 9	W. McLaren & Son	2,347 0 0
R. Yeaman	3,333 0 0		

LEYTON.—For the furnishing of the Ruckholts Schools, Leyton' E., for the Leyton School Board. Messrs. J. T. Newman & Jacques, Architects to the Board :—

Pearson & Brown	£952 12 1	Wake & Dean*	£892 0 0
Educational Supply	949 0 0		

* Accepted.

LEYTONSTONE.—For the erection of St. Margaret's Church, Leytonstone, E, for the Rev. E. Sant, M.A., and Committee. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Son :—

A. J. Reed	£8 385	Morter	£7,161
Nightingale	7,972	Gregar & Son	7,089
Hearle & Farrow	7,659	Coxhead	6,827
Longley	7,479	Catley	6,580
Sharpe	7,337	S. J. Scott (accepted)	6,330
Brown & Co.	7,240		

LONDON.—For the erection of manufacturing premises and for alterations to existing premises in Rouel-road, Bermondsey, S.E., for Messrs. Pearce, Duff, & Co. Mr. C. E. Evans, architect, 51, Rosslyn-hill, Hampstead, N.W. Quantities by Mr. G. Fleetwood, 15, Furnival's Inn, Holborn, E.C. :—

Holland & Hannen	£12,622	Ashby Bros.	£11,190
Dove Bros.	11,900	G. H. & A Bywaters	10,978
J. Grover & Son	11,810	E. Lawrence & Sons	10,915
Holloway Bros.	11,723	Higgs & Hill	10,694
Colls & Sons	11,658	W. H. Lascelles & Co.*	10,495
Hall, Beddall, & Co.	11,305		

* Accepted, omitting glazed brick facing to lavatories, at £10,295.

LONDON.—For alterations, additions, and repairs to the Gresham Hall, Gresham-road, Brixton, S.W., for the Gresham Hall Company, Limited. Mr. J. William Stevens, architect and surveyor, 21, New Bridge-street, City, E.C. :—

Prestige	£580	Parson	£477
Bowyer	565	Young & Lonsdale	477
Whitehead	550	Holliday & Greenwood	475
White & Co.	509	Farmer	449

LONDON.—For repairs to three houses, for the united charities of St. Olave's, S.E. Mr. H. Stock, architect :—

Greenwood & Son	£719	W. Pritchard	£630
W. Castle	650	A. Stephens	594
J. Bullers	649	W. Walesby	500

LONDON.—For rebuilding the front of No. 65, Cheapside, E.C., and sundry internal alterations, &c., for the Directors of Sir John Bennett, Limited. Mr. A. Burnell Burnell, architect. Quantities by Mr. H. T. A. Chidgey :—

Colls & Sons	£1,891	McCormick & Son	£1,564
Harris & Wardrop	1,596	Grover & Son	1,547

LONDON.—For cleansing the interior of South Hallsville Schools, Victoria Docks, E., for the West Ham School Board. Messrs. J. T. Newman & Jacques, Architects to the Board :—

Allen & Cleminson	£534 0	Bishop & Webb	£324 0
Hosking	389 0	Maddison	215 0
Vigor & Co.	339 10	Fulcher (accepted)	205 0

MANSFIELD (Notts).—Accepted for building house, St. John-street, Mansfield, exclusive of party wall, for Mr. G. H. Munks. Mr. R. Frank Vallance, architect. Quantities by the architect :—

S. & G. Frisby, Mansfield £850 0 0

[Three tenders received.]

MANSFIELD (Notts).—For alterations to "Charter Arms," Mansfield, for Messrs. James Hole & Co., Limited. Mr. R. Frank Vallance, architect :—

Jas. Greenwood	£540	Geo. Bradder	£458
W. A. Vallance	490	S. & G. Frisby, Mansfield*	453

*Accepted.

ONLLWYN (South Wales).—For the erection of a new schoolhouse and offices, for the Dylais Higher School Board. Mr. Philip Williams, Ystradgynlais, Swansea Valley :—

Evan Thomas	£450 0	John Thomas, Crynant,	
Richard Thomas	416 0	Neath (accepted)	£405 19

OUNDLE.—Accepted for the construction of the new waterworks and sewage disposal works at Oundle, for the Commissioners. Mr. W. H. Radford, Engineer, Nottingham :—

Cochrane & Co., Dudley, for Iron pipes	£1,896 4 8
Freeman & Son, Thrapston, for general contract	3,463 18 2
Freeman & Son, Thrapston, for the sewage disposal contract	2,986 1 11

PLASHET.—For alterations to the Girls' and Infants' Departments at the Industrial Schools, Plashet, Upton Park, E., for the Guardians of St. George-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects, 1, Victoria-street, Westminster, S.W. :—

J. Mills	£465	J. Holland	£447
J. R. Hunt	456	T. White & Son (accepted)	443

STRATFORD.—For the furnishing of the British Schools, Stratford, E., for the West Ham School Board. Messrs. J. T. Newman & Jacques, Architects to the Board :—

Spencer & Co.	£1,041 0 0	Educational Supply	£869 0 0
Pearson & Brown	884 2 10	Wake & Dean (accepted)	825 10 0

WAREHAM.—For repairs to Bailey Ridge Farm House, for Streech's Alms House Charity. Mr. W. Watts Fookes, architect and surveyor, Wareham :—

W. Jerrard (accepted) £217 10

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Walnut Dadoes ,, 1s. 11d. ,,
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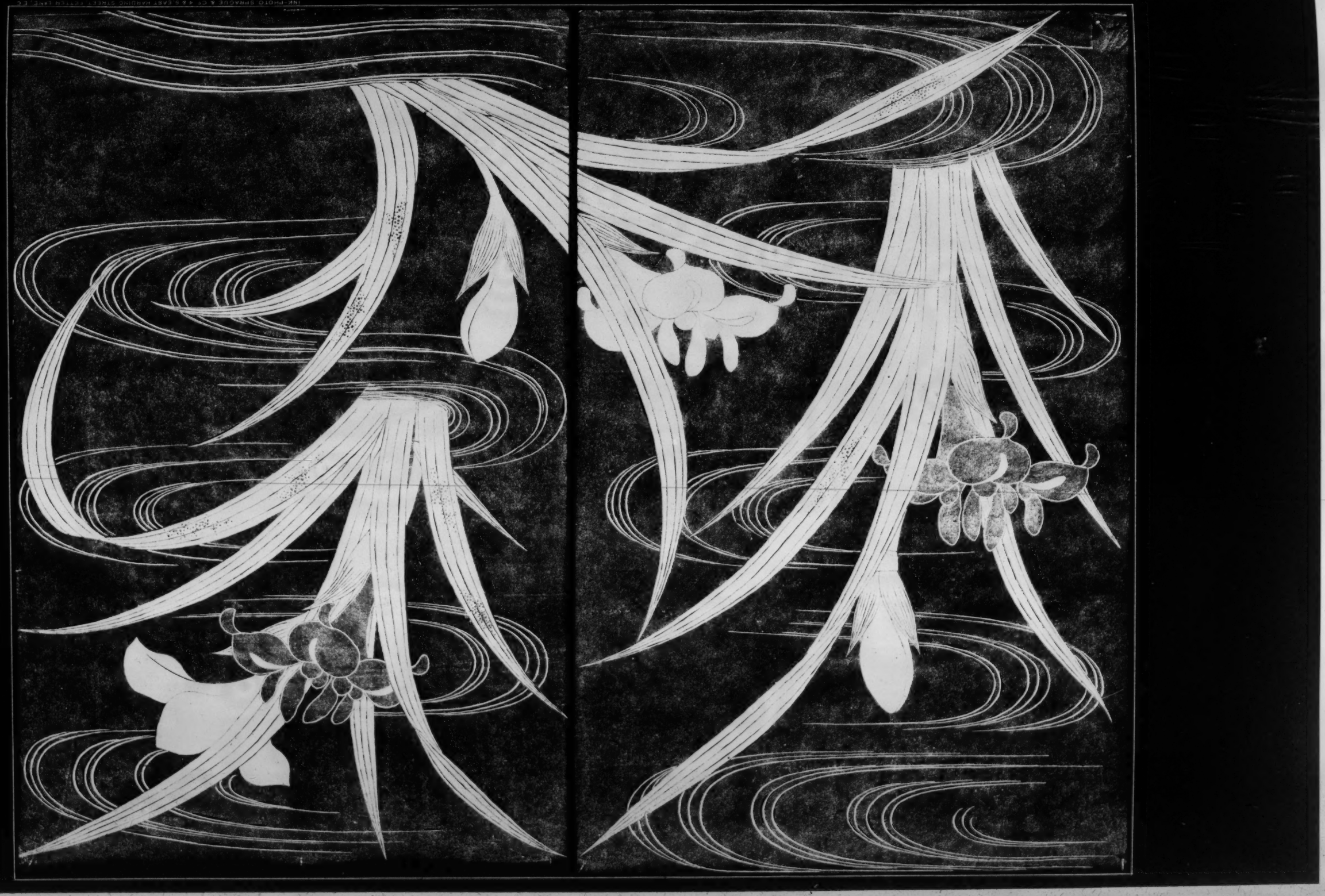

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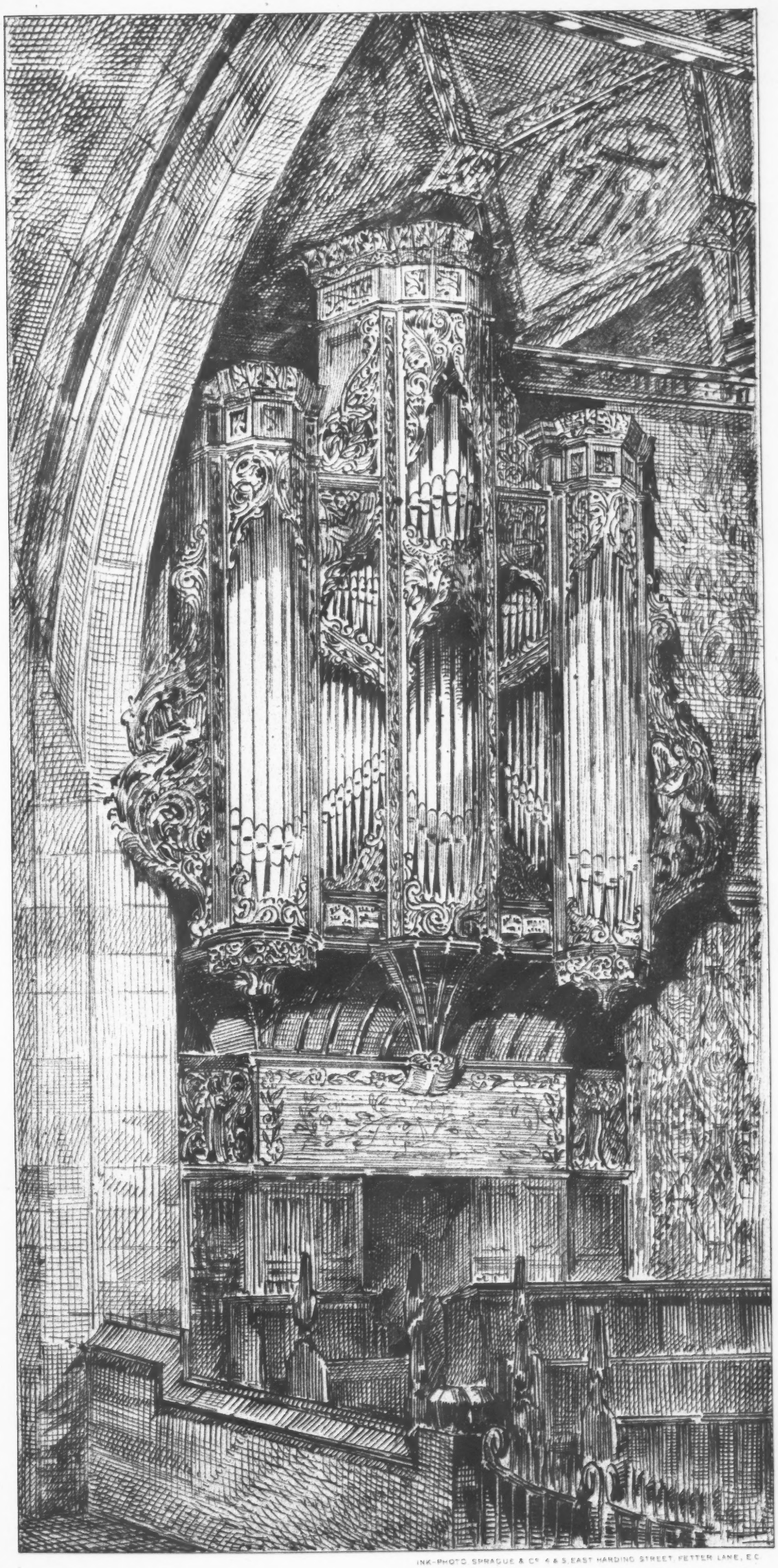

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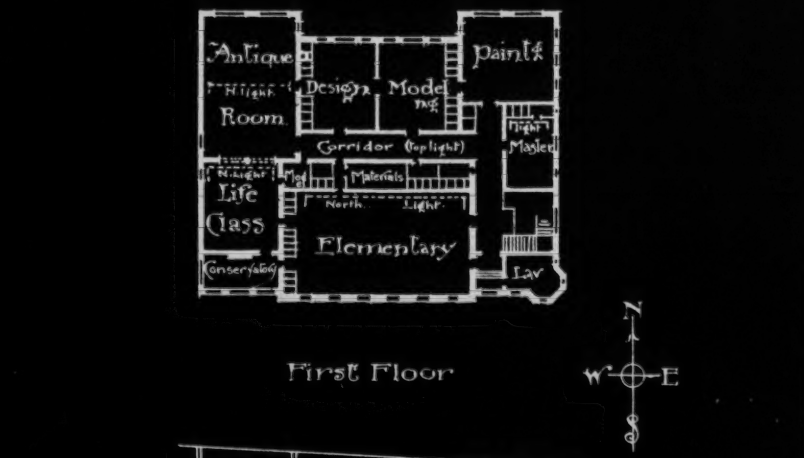

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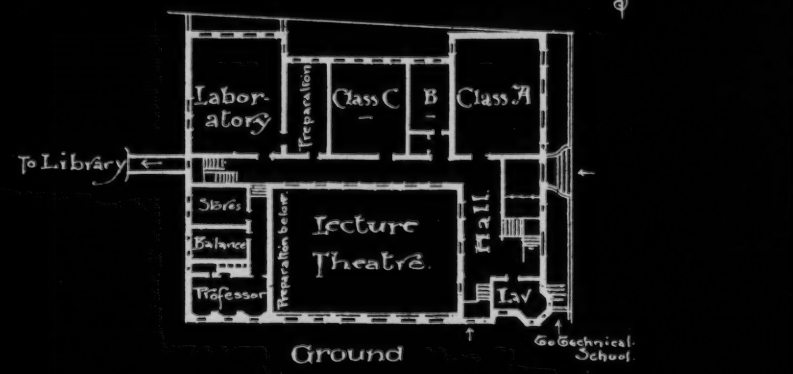

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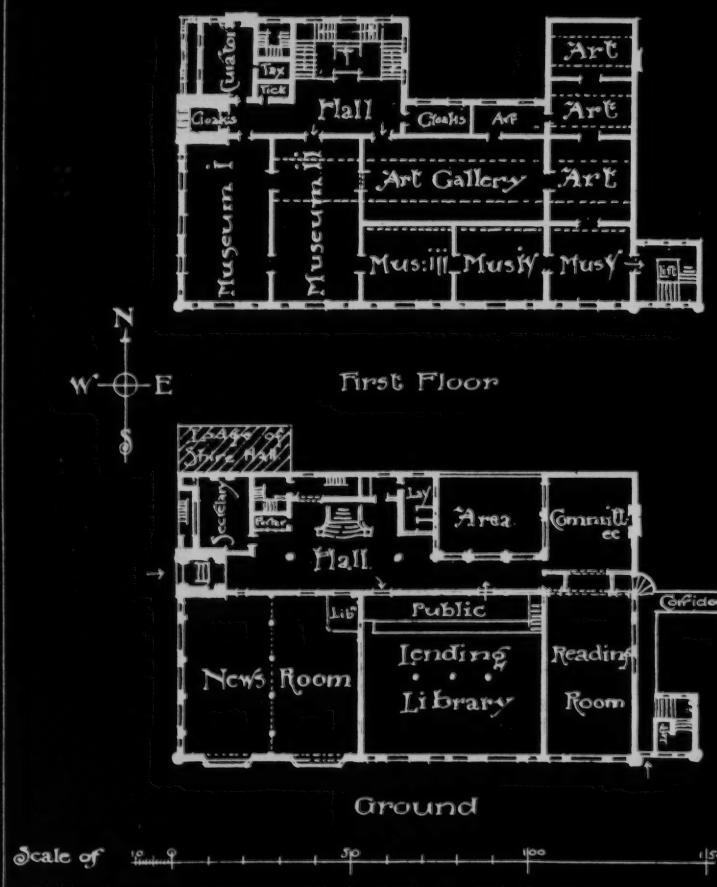

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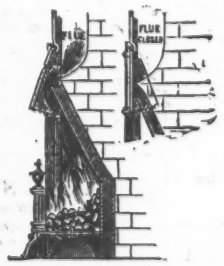

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16	× 5	× 52 lbs.	10	× 6	× 45 lbs.
15	× 6	× 61 lbs.	10	× 5	× 35 lbs.
15	× 5	× 42 lbs.	10	× 5	× 29 lbs.
14	× 6	× 57 lbs.	10	× 4½	× 31 lbs.
14	× 6	× 47 lbs.	9	× 7	× 58 lbs.
13	× 5	× 41 lbs.	9	× 3½	× 24 lbs.
12	× 6	× 54 lbs.	8	× 6	× 36 lbs.
12	× 5	× 32 lbs.	8	× 5	× 31 lbs.

SECTIONS OF JOISTS.

in.	in.		in.	in.	
8	× 4	× 25 lbs.	5	× 3	× 15 lbs.
7	× 3½	× 20 lbs.	4½	× 1½	× 9 lbs.
6½	× 3½	× 18 lbs.	4½	× 3	× 14 lbs.
6	× 5	× 26 lbs.	4	× 3	× 12 lbs.
6	× 3	× 16 lbs.	4	× 1½	× 8 lbs.
6	× 2	× 12 lbs.	3½	× 3	× 10 lbs.
5½	× 2	× 11 lbs.	3½	× 1½	× 6 lbs.
5	× 5	× 25 lbs.	3	× 3	× 10 lbs.
5	× 4½	× 23 lbs.	3	× 1½	× 5 lbs.

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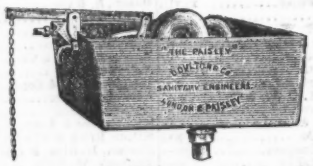

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COMPETITION.

THE GOVERNMENT of EGYPT is prepared to receive, up to the 31st JANUARY, 1892, PROPOSITIONS for the DRAINAGE of the CITY of CAIRO.

Such propositions, accompanied by whatever plans and documents are necessary, should be addressed to the Office of the undersigned, at the Ministry of Public Works, Cairo.

A premium of 200*l.* will be granted to the author of what is considered the best project, but the Government does not hold itself bound to accept any, should it not consider any of them suitable.

COLIN SCOTT MONCRIEFF,
Under Secretary of State.

Ministry of Public Works,
Cairo,
November 21st, 1891.

CONTRACTS.

WAR DEPARTMENT CONTRACT.

NOTICE TO BUILDERS.

TENDERS are required for the ERECTION of QUARTERS for TWENTY GENTLEMEN CADETS, and WORKS in connexion therewith, at the Royal Military Academy, in the Woolwich District.

Persons desiring to Tender for the execution of these Works, must leave their names at the Royal Engineer Office, Mill-lane, Woolwich, on or before the 31st day of DECEMBER, 1891, and pay the sum of Ten Shillings for the bills of quantities, which, with form of Tender, will be issued to each candidate.

The Secretary of State for War does not bind himself to accept the lowest or any Tender.

A. C. WARD,
Lieut.-Colonel R.E.
Commanding Royal Engineer.

Royal Engineer Office,
Woolwich,
December 9th, 1891.

COUNTY OF HERTFORD.

TO BUILDERS.

PROPOSED LOCK-UP AT GREAT BERKHAMSTEAD.
EXTENSION OF TIME.

The Standing Joint Committee of the Quarter Sessions and the County Council are willing to receive TENDERS for the ERECTION of a LOCK-UP, &c. at Great Berkhamstead, Herts.

Builders desirous of contracting for the works may see the drawings, specifications, agreement, &c. at the County Surveyor's Office, Victoria Mansions, 28, Victoria-street, Westminster, S.W. on and after TUESDAY, 22nd DECEMBER, between the hours of ELEVEN a.m. and FIVE p.m.

A copy of the bills of quantities and a form of Tender can be obtained at the County Surveyor's Office upon the payment of Two Guineas, which sum will be returned to the Contractor upon the receipt of a bonâ-fide Tender and the documents which have been supplied to him.

Sealed Tenders, addressed to the Chairman of the Lock-ups Committee, and endorsed "Tender for Great Berkhamstead Lock-up," must be delivered under cover, to me here, not later than FIVE p.m. on THURSDAY, 7th JANUARY, 1892.

Such security for the due execution of the works as the Committee may require must be given by the Contractor.

The lowest or any Tender will not necessarily be accepted.

URBAN A. SMITH,
County Surveyor.

Victoria Mansions, S.W.
December 23rd, 1891.

COUNTY BOROUGH of CROYDON.

REPAIR OF PRIVATE ROADS.

Notice is hereby given that the Council are prepared to receive TENDERS for the REPAIR of Sussex-road, Croydon.

Plans and specifications of the required works may be seen on application at the Borough-road Surveyor's Office, 8, Katherine-street, Croydon.

Tenders to be sent to me by ELEVEN o'clock in the forenoon, on TUESDAY, the 12th JANUARY, 1892, endorsed "Tender for Road Repair."

The Council will not be bound to accept the lowest or any Tender.

By order,
C. M. ELBOROUGH,
Town Clerk.

Town Hall, Croydon,
December 18th, 1891.

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SUM INSURED IN 1890, £361,500,000.

VESTRY of the PARISH of FULHAM.

TO MASONS, PAVIORS, ROADMAKERS, CONTRACTORS, AND OTHERS.

The Vestry of Fulham hereby give notice that they will be prepared, at their next Meeting, to be held on WEDNESDAY, the 6th day of JANUARY, 1892, at SEVEN o'clock in the evening, to receive TENDERS for MAKING-UP and PAVING Rostrevor-road, Sec. II. Pursers Cross-road, Sec. I. and Halford-road, Sec. II, Fulham.

Plans and specifications of the intended works may be seen, and any further information obtained, from Mr. W. SYKES, New Streets Surveyor to the Vestry, Town Hall, Walham Green.

The Contractors are to attend personally, or be represented, at the Vestry Meeting, to deliver their own Tenders, to wait until all Tenders are opened, and to answer questions.

The Contractor is required to deliver with his Tender a 10*l.* Note, and a schedule of prices upon which the value of any extras or omissions shall be based, and to make a declaration that he pays the Union rate of wages, observes such hours of labour as are generally accepted as fair in his trade, and that all unskilled labour shall be paid the minimum wage of Sixpence per hour.

The Vestry do not pledge themselves to accept the lowest or any Tender.

By order,
W. J. H. DENSELOW,
Clerk to the Vestry.

Town Hall, Walham Green, S.W.
December 17th, 1891.

VESTRY of the PARISH of FULHAM

TO SEWER CONTRACTORS AND OTHERS.

The Vestry of Fulham hereby give notice that they will be prepared, at their next Meeting, to be held on WEDNESDAY, the 6th day of JANUARY, 1892, at SEVEN o'clock in the evening, to receive TENDERS for PROVIDING and LAYING about 150 feet run of 12 inch PIPE SEWER, with Manholes, &c. complete, in Silvis-street, Fulham.

Plans and specifications of the intended works may be seen, and any further information obtained, from Mr. J. P. NORRINGTON, A.M.I.C.E. Surveyor to the Vestry, Town Hall, Walham Green.

The Contractors are to attend personally, or be represented, at the Vestry meeting, to deliver their own Tenders, to wait until all Tenders are opened, and to answer questions.

The Contractor is required to deliver with his Tender a 10*l.* Note, and a schedule of prices upon which the value of any extras or omissions shall be based, and to make a declaration that he pays the Union rate of wages, observes such hours of labour as are generally accepted as fair in his trade, and that all unskilled labour shall be paid the minimum wage of Sixpence per hour.

The Vestry do not pledge themselves to accept the lowest or any Tender.

By order,
W. J. H. DENSELOW,
Clerk to the Vestry.

Town Hall, Walham Green, S.W.
December 17th, 1891.

CHICHESTER.

TENDERS are invited for the ERECTION of NEW CONGREGATIONAL CHURCH and SCHOOLS, Chichester.

Plans and specifications may be seen at the Offices of the Architect, Mr. E. J. HAMILTON, 2, New-road, Brighton, from whom also copies of quantities can be obtained, from DECEMBER 30th to JANUARY 5th inclusive only, price 10s. (not returnable) to cover cost of lithography.

Tenders, endorsed "Tender for New Church, &c." to be delivered to JAMES HILTON, Esq. Harcourt-villa, Chichester, on or before FRIDAY, JANUARY 15th, 1892.

The lowest or any Tender not necessarily accepted.

[See also p. vi.

IMPERIAL FIRE INSURANCE COMPANY (Established 1803), 1, Old Broad-street, E.C. and No. 22, Pall Mall, S.W.

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R. C. BIGNOLD, Secretary.

Norwich, December 25th, 1891.

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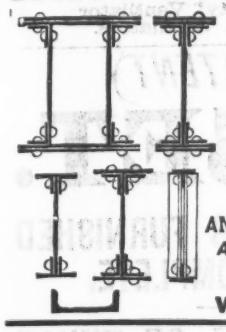

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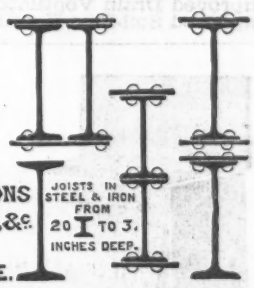

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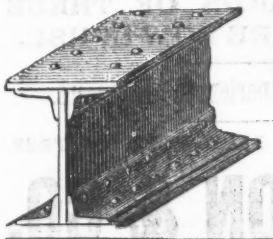

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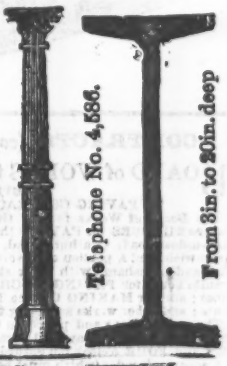

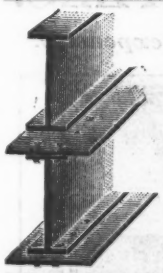

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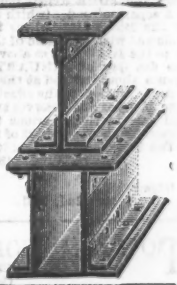

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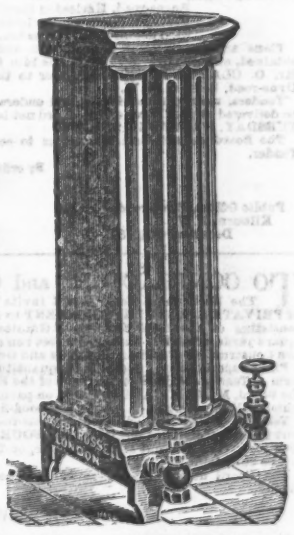
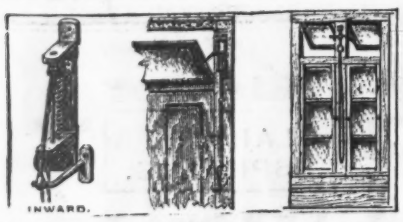
ANGLE RADIATOR.



Agents for B. HERMAN's German Porcelaine Stoves. PRICE LISTS FREE. TRADE SUPPLIED.



Made to suit Lights hung any way, with either Cord or Rod Action.

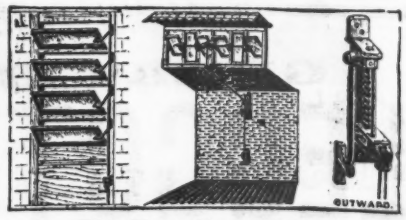
Prices and Full Particulars Post-free.

BAIRD, THOMPSON & CO.

Patentees and Manufacturers.

IMPROVED PATENT

FANLIGHT OPENERS.



The Very Best Opener for Strength and Compactness, Locked at any Angle. A Child can Adjust it.

Improved Exhaust Ventilators.
Improved Air-Inlet Ventilators.
Improved Mica-Flap Ventilators.
Improved Drain Ventilators.
Improved Soil-Pipe Ventilators.

Improved Patent Radiators.
Skylight and Fanlight Openers.
Drain-Test Machines ("Smoke-Test.")
Improved Dry Closet (Earth or Ashes).
"Semi-Prism" Pavement, &c., Lights.

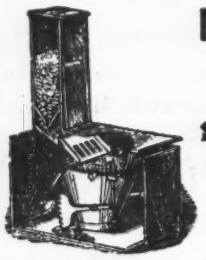
Improved Sheringham Ventilators.
Improved Chimney Cowls.
Improved Air-Propellors.
Improved "Waterspray" Ventilator
Arnott, Venetian, &c., Ventilators.

NEW AND IMPROVED SELF-ACTING (PATENT)

EARTH CLOSET.

DRY (EARTH OR ASHES.)

The Cheapest & Best



SECTION.

PLANS AND ESTIMATES FURNISHED FOR FITTING UP COMPLETE.

SEVERAL THOUSANDS OF THESE EARTH CLOSETS ARE NOW IN USE.

Inspections made by Experienced Engineers.

ILLUSTRATED CATALOGUES & PRICE LISTS POST-FREE.

BAIRD, THOMPSON & CO.

Consulting Ventilating, Heating, and Sanitary Engineers,

165, QUEEN VICTORIA ST., LONDON, E.C.

24, BATH STREET, GLASGOW.

CONTRACTS (*continued from* p. iv.).

BOARD of WORKS for the GREENWICH DISTRICT.

TO PAVING CONTRACTORS AND OTHERS.

The Board of Works for the Greenwich District is prepared to receive TENDERS for PAVING the FOOTWAYS of Furzefield-road, Hassandean-road, Couthurst-road, Lyveden-road, in the parish of Greenwich, and a portion of Elverson-road in the parishes of Greenwich and Lewisham, with York stone and Aberdeen and Guernsey granite kerb; for PAVING the CHANNELS with Aberdeen granite cubes; and for MAKING UP the ROADWAYS with hard core and flints; and other works according to the specifications and plans.

The specifications and plans can be seen and particulars obtained at the Offices of the Board, 141, Greenwich-road, Greenwich, between TEN and FOUR o'clock (on Saturdays between TEN and ONE).

A separate Tender (which must be made on the form to be supplied at the Board's Offices) for the works in each street, sealed up and endorsed with the name of the street to which it refers, must be sent in to the said Offices as above, before FOUR p.m. on WEDNESDAY, the 6th day of JANUARY, 1892, and parties Tendering or their agents should attend at the said Offices at SEVEN p.m. on that day.

A declaration to the effect that the person Tendering pays such rate of wages and observes such hours of labour as are considered just and fair in their various trades, will have to be signed by each person Tendering as part of their Tender.

The Board does not bind itself to accept the lowest or any Tender.

(Signed) J. SPENCER,
Clerk of the Board.

Greenwich,
December 22nd, 1891.

TO ROAD CONTRACTORS.

PRIVATE IMPROVEMENTS.
Contract No. 48.)

The Willesden Local Board are prepared to receive TENDERS for MAKING UP CARRIAGEWAYS and PAVING FOOTWAYS in the following Roads, viz:

Burns-road, Harlesden (portion of).
Fortune Gate-road, Harlesden (portion of).
St. Thomas-road, Harlesden.

Plans and specification may be seen, and all further particulars obtained, on and after MONDAY, the 14th inst. upon application to Mr. O. CLAUDE ROBSON, Engineer to the Board, Public Offices, Dyne-road, Kilburn, N.W.

Tenders, upon printed forms, and endorsed "Private Roads," to be delivered at the Offices of the Board not later than FOUR p.m. on TUESDAY, DECEMBER 29th, 1891.

The Board do not bind themselves to accept the lowest or any Tender.

By order,
SAMUEL TILLEY,
Clerk.

Public Offices, Dyne-road,
Kilburn, N.W.
December 9th, 1891.

TO CONTRACTORS and OTHERS.

The Beckenham Local Board invite TENDERS for WORKS of PRIVATE STREET IMPROVEMENT in Lucas-road, Beckenham, consisting of about 840 feet run of Granite Kerb and Channel, 800 square yards of Brick Paving, 415 feet run of Road Formation, and the Construction of certain Manholes and Gullies.

Plans, specification, and bills of quantities can be inspected, and form of Tender obtained at the Office of the Engineer and Surveyor to the Board, Mr. G. B. CARLTON, C.E. on payment of a deposit of £1 1s. which will be returned on receipt of a bonâ-fide Tender.

Tenders, sealed and endorsed "Lucas-road Improvements," to be sent to the undersigned not later than FOUR p.m. on MONDAY, the 28th inst. Tenders sent after that time, or to any other person, will not be entertained.

The Board do not bind themselves to accept the lowest or any Tender.

By order,
F. STEVENS,
Clerk to the Board.

December 11th, 1891.

TO BUILDERS and CONTRACTORS.

BRIGHTON WEST PIER COMPANY.

The Directors invite TENDERS for the following WORKS, namely:—

CONTRACT A.

Strengthening the existing Pier Head, by means of additional Piles, Girder Work, and Bracing in Wrought Iron.

CONTRACT B.

Erecting a Pavilion on the Pier Head about 125 feet by 100 feet, and 40 feet high, with Veranda, Gallery, Stage, Dome, and Promenade Roof.

Drawings and specifications, describing the works included in the above contracts, may be seen at the Offices of the Company's Engineer, Mr. R. W. PEREGRINE BIRCH, M.Inst.C.E. No. 5, Queen Anne's-gate, Westminster, and all necessary information obtained on and after MONDAY, the 28th DECEMBER inst. upon payment of Five Pounds, which will be returned on receipt of a bonâ-fide Tender.

Tenders, in the prescribed form only, must be received at the Offices of the Company, West Pier, Brighton, on or before THURSDAY, JANUARY 7th, 1892.

The Directors do not bind themselves to accept the lowest or any Tender.

By order of the Board,
(Signed) I. WILKINSON,
West Pier, Brighton. Secretary and Manager.

CITY of LIVERPOOL.

TENDERS FOR THE SUPPLY OF MATERIALS AND FOR THE EXECUTION OF WORKS.

The Corporation are prepared to receive the NAMES of persons and firms who are willing to be placed on the list of CONTRACTORS for—

(a) Materials only (such as Sets, Curbs, &c.)
(b) Labour only (such as Carting, &c.)
(c) Labour and Material (such as Building, Flagging, Uniform Clothing, &c.)

A list of the articles required to be supplied, and of the kinds of work required to be executed, can be obtained on application at the Town Clerk's Office, Municipal Buildings, Dale-street, Liverpool, together with a form of application to be placed on the list of Contractors.

The Applications must be delivered at the Town Clerk's Office not later than FIVE o'clock p.m. on THURSDAY, the 31st DECEMBER, 1891.

GEORGE J. ATKINSON,
Town Clerk.

Town Clerk's Office, Liverpool,
December 19th, 1891.

THE PUBLIC HEALTH ACT.

BOROUGH OF BUCKINGHAM

Notice is hereby given that the Town Council of the Borough of Buckingham, acting as the Urban Sanitary Authority of that district, are prepared to receive TENDERS from persons desirous of contracting with them for the works necessary in SINKING and STRIKING Two trial SHAFTS in connection with the proposed Water Works, one of which is located in the Parish of Maids Moreton, and the other in the Parish of Akeley; also the LAYING and JOINTING of several lengths of 4-inch and 7-inch CAST IRON WATER PIPES.

A plan and section of the proposed works, together with a copy of the specification, may be seen at the Office of Mr. BALDWIN LATHAM, Mem.Inst.C.E. 13, Victoria-street, Westminster, the Engineer for the Works, or at my Office in Buckingham.

Copies of the quantities taken out by Messrs. HOVENDEN & BERRIDGE, of 30, Bishopsgate-street Without, may be had on application either to the Engineer or myself, on deposit of £1, which will be returned to every person making a bonâ-fide Tender on the return of the documents entrusted to them after a contract has been entered into.

The Council do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, endorsed "Tender for Buckingham Water Works," to be delivered at my Office in Buckingham, not later than the 5th day of JANUARY, 1892.

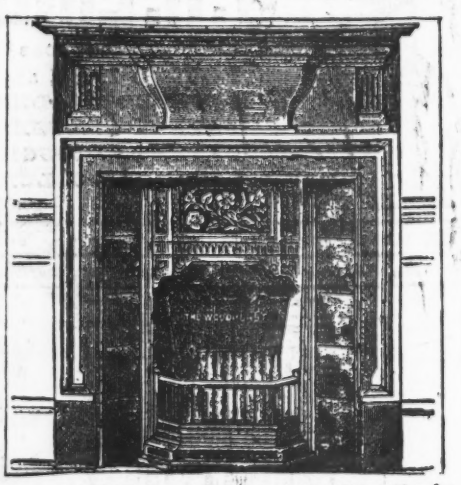
Dated this 16th day of December, 1891.

THOMAS R. HEARN,
Town Clerk.

[*See also* p. viii.

IRON ART MANTELS & OVERMANTELS.

Imperishable. — Inexpensive.



No. 1742.—Mantel Register, with Tile Cheeks.

Width.	Plain.	Enamel Painted.
3 ft. 2 in.	£2 10 0	£2 18 6
2 ft. 10 in.	£2 2 0	£2 10 6

Apply for our New Catalogue of Designs.

Yates, Haywood, & Co.

95m, Upper Thames-st., London.

Extensive Showrooms as above.

MANUFACTURERS TO H.M. GOVERNMENT.

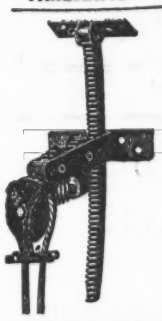
GREAT REDUCTION in Price List of

LEGGOTT'S ADJUSTMENT

FOR OPENING AND CLOSING FANLIGHTS AND LIFTING SKYLIGHTS.

SILENS FOR FANLIGHTS.

From 3s. 6d. each. Is admitted to be THE BEST ever put before the public.



SILENS FOR SKYLIGHTS.

From 4s. 9d. each.

Also made that with use of pulley-cord can be conducted to any part of room.

These SKYLIGHT OPENERS are unsurpassed.

If you have not already received our REDUCED PRICE LIST, dated August 1st, 1890, please write for one.

W. & R. LEGGOTT,

MAKERS OF PATENTS AND SPECIALTIES

235, HIGH HOLBORN, W.C.

109, HOPE-STREET, GLASGOW.

—AND—

SILENS WORKS, BRADFORD.

Telegraphic Address, "Silens," Bradford.

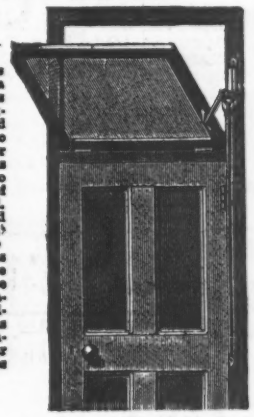
ESTIMATES GIVEN FOR CONTINUOUS & SPECIAL OPENERS

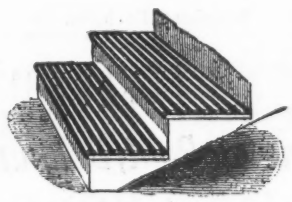
CAN DESPATCH ON RECEIPT OF ORDER.

STOCKS ALWAYS ON HAND.

THE "WILMOS."

The WILMOS is worked with a rod or endless cord. It is extremely neat, and can be fixed to open either top or bottom, inwards or outwards no cutting away of frame required. When worked with a rod is most efficient for Public Buildings, as the key can be loose. For Price Lists, Illustrations and Testimonials, write as below. For Continuous and other Lights, Estimates given.





Black lines represent Lead—other parts Chilled Steel, Brass, or other Hardened Metal.

MASON'S PATENT

Unwearable Stair Treads

NON-SLIPPING AND WEAR-RESISTING HYDRANT COVERS, COAL PLATES, &c.

15, BARBICAN, LONDON, E.C.

The ONLY PERFECT NON-SLIPPING COVERING in the Market.

London Plate-Glass Insurance Company, Lim.

49, QUEEN VICTORIA STREET, E.C.

GLASS of all kinds covered by the Policies of this Company.

AMPLE SECURITY. MODERATE RATES.

PROMPT REPLACEMENTS.

Glass Insured in Transit. Glass Insured in Private Houses. Surveys and Estimates free. Ten per cent. of the Premiums returned every six years in cases where no claim has arisen.

AGENTS WANTED.—Liberal terms to Builders, or Builders Foremen.—Apply to Manager.

SUGG'S PATENT CONTINUOUS UP-DRAUGHT VENTILATOR

For Public Buildings, Houses, Ships, Churches, Banks, Clubs, Hotels, &c. &c.

CHEAP, USEFUL, & DURABLE.

Cannot get out of order, and requires no oiling or attention.

Send for prices and full particulars.

WILLIAM SUGG & CO. LIMITED,

Engineers and Manufacturers also of Economic Ventilating Gas Lights.

Vincent Works, Westminster, S.W. 1 and 2, Grand Hotel Buildings, Charing Cross. 33, Bold Street, Liverpool. Crystal Palace, Sydenham. Amsterdam and Paris.

SMOKE-CONSUMING (Absolutely).

HEIM'S GRATES AND STOVES

(PATENTED EVERYWHERE).

95 & 97, OXFORD STREET, LONDON, W.

WORKSHOPS—DEAN STREET. Formerly 41, Holborn-viaduct, E.C.

PORTABLE

LIGHT FROM OIL UP TO 4,000 C.P

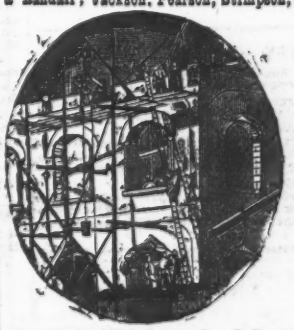
FOR BUILDERS, CONTRACTORS, &c.

OVER 6,000 'WELLS LIGHTS' SOLD

BEWARE OF IMITATIONS.

THE ONLY SUCCESSFUL LAMP.

USED by Messrs. Lucas & Aird, Mowlem, Brass, Chappell, Kirk & Randall; Jackson, Pearson, Stimpson, Holme & King, Wall, &



ALL LEADING FIRMS.

OVER 500 IN USE ON THE MANCHESTER SHIP CANAL.

SIMPLE, STRONG. NO MACHINERY.

5 different sizes.

EACH LAMP GUARANTEED

A. C. WELLS & CO. 94, Midland-road, St. Pancras, LONDON.

FRENCH ASPHALTE COMPY.

(Société Française des Asphaltes, Limited)

Are the largest importers of NATURAL ROCK ASPHALTE in Great Britain, and deal only in the product of their own freehold mines at Garde Bois in the Seyssel Basin, and at St. Jean-de-Maruejols (Gard).

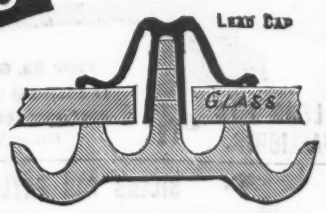
For Prices, Samples, and all Particulars, apply at the Offices of the Company,

SUFFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.

Works · Brighouse · Yorkshire.

London·Office, 9, Victoria Street, WESTMINSTER, S.W.

HELLIWELL'S patent GLAZING



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(THE SUNBURY WALL-DECORATION).

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"SPECIAL ART TINTS" and "PLAIN GROUNDS." Colours same all through Material. Perfect in Quality and Colour.

INDESTRUCTIBLE AND INEXPENSIVE.

Write for Samples, Illustrations, and Price Lists, to

FREDERICK WALTON & CO., LIM. (Sole Patentees and Manufacturers),

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Telegrams, "LINCRUSTA-WALTON, LONDON." Telephone, No. 3,769.

TRADE MARK

FOR **BEST WINDOW GLASS** APPLY TO

The RED STAR GLASS WORKS CO., Marchienne au Pont, Belgium.

QUALITY GUARANTEED SECOND TO NONE.

CONTRACTS—*Continued from p.* vi.

NORTH-EASTERN RAILWAY.

STATION IMPROVEMENT AND BRIDGES OVER THE RAILWAY AND STREAM, AND OTHER WORKS AT BRIDLINGTON.

TO BUILDERS, CONTRACTORS, AND OTHERS.

The Directors are prepared to receive TENDERS for the above work, including the Iron Bridge over the Railway, with the masonry abutments, retaining walls, and approaches thereto.

There will be in round numbers about 5,000 cubic yards of brickwork, and about 180 tons of wrought ironwork.

Plans, specifications, and quantities may be seen on personal application, at the Office of Mr. H. COPPERTHWAITE, Engineer, York, on and after MONDAY, the 28th inst.

Sealed Tenders, marked "Tender for Works at Bridlington," must be sent to the Secretary, at York, not later than noon on WEDNESDAY, the 6th JANUARY, 1892.

The Directors do not bind themselves to accept the lowest or any Tender.

C. N. WILKINSON,
Secretary.

York, December 17th, 1891.

NORTH-EASTERN RAILWAY.

BRIDGE OVER THE RAILWAY AT CRAVEN-STREET, HULL.

TO BUILDERS, CONTRACTORS, AND OTHERS.

The Directors are prepared to receive TENDERS for the above WORK, including the Iron Bridge over the Railway, with the masonry abutments, retaining walls, and approaches thereto.

There will be in round numbers about 2,000 cubic yards of brickwork, and about 70 tons of wrought ironwork.

Plans, specifications, and quantities may be seen on personal application at the Office of Mr. H. COPPERTHWAITE, Engineer, York, on and after MONDAY, the 28th inst.

Sealed Tenders, marked "Tender for Craven-street Bridge, Hull," must be sent to the Secretary, at York, not later than NOON on WEDNESDAY, the 6th JANUARY, 1892.

The Directors do not bind themselves to accept the lowest or any Tender.

C. N. WILKINSON, Secretary.

York, December 17th, 1891.

MIDLAND RAILWAY.

TO CONTRACTORS AND BUILDERS.

The Directors of the Midland Railway Company are prepared to receive TENDERS for the ERECTION of NEW GOODS WAREHOUSE, at the Wicker, Sheffield.

Plans and specifications may be seen, quantities and particulars obtained, on application to the Company's Architect, Cavendish House, Derby; or at the Engineer's Office, Derby Station, on and after TUESDAY, 22nd inst.

Sealed Tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than NINE a.m. on FRIDAY, JANUARY 1st, 1892.

The Directors do not bind themselves to accept the lowest or any Tender, nor to pay any expenses attending the same.

JAMES WILLIAMS,
Secretary.

Derby,
December 21st, 1891.

WIMBLEDON LOCAL BOARD.

TENDERS FOR CONCRETE PAVING.

The Board is prepared to receive TENDERS for SUPPLYING and LAYING about 2,300 yards super. of GRANITE CONCRETE PAVING, in accordance with plans and specification to be seen at the Local Board Office, Broadway, Wimbledon.

Tenders to be delivered at the said Office, endorsed "Tenders for Paving," on or before TUESDAY, 5th JANUARY, 1892.

The Board do not bind themselves to accept the lowest or any Tender.

By order,
W. H. WHITFIELD, Clerk.

Offices of the Board,
Broadway, Wimbledon,
December 22nd, 1891.

CRAB TREE WHARF, FULHAM, S.W.

—Barges berthed, and unloaded with steam crane. Bricks and other goods carted to any part. Sand, ballast, and cement for sale.—Apply, JOSEPH MEARS, Collingham-gardens, South Kensington.

WANTED TO PURCHASE.

ALL KINDS OF MACHINERY, OLD IRON, LEAD, ZINC, and other METALS Any quantities for cash.

G. STEWART,
ACRE WHARF, BELVEDERE ROAD, S.E.

ST. MARY'S HOSPITAL, Paddington.—

TO THOSE INTRODUCING THE ELECTRIC LIGHT.—WANTED, a Bold Hall GAS LAMP.—Particulars to STANLEY G. BIRD, 31, Bedford-street, Strand.

TO BRICK-MAKERS, TIMBER and

SLATE MERCHANTS, and OTHERS.—The advertiser, about building a quantity of houses, is open to PURCHASE, in large or small quantities, all kinds of Bricks, Timber, Slates, and any articles used in Building and Decorating.—Address particulars to Mr. W. M. WEBSTER, Clock House Estate Office, White Hart-lane, Tottenham, London.

TO BUILDERS and CONTRACTORS.—

Portable Engines, Mortar Mills and Engines (combined and separate), Steam Cranes, Pumps (any description), Friction Hoists, Winding Engines, and all kinds of machinery, FOR HIRE. Apply to

HENRY SYKES { 66 Bankside, Southwark S.E.

FOR SALE or HIRE.

BUILDER and CONTRACTOR'S PLANT.

PORTABLE ENGINES, 4, 6, 8, 10, 14, and 20-h.p.
PORTABLE STEAM CRANES.
MORTAR MILLS, 6, 7, 8, and 9 feet pans.
COMBINED ENGINES and MORTAR MILLS.
FRICTION BARROW HOISTS.
DEAL FRAMES, SAW BENCHES.
GENERAL JOINER, BAND SAW.
And a large Stock of Machinery of Every Description To be seen at

HOUGHTON BROWN BROS.

KINGSBURY IRON WORKS, BALLS POND, LONDON,

Telegraphic Address, "Spherulite, London." Telephone No. 256.

10-H.P. Compound Portable ENGINE, by

Marshall, Sons, & Co. equal to new; also 4, 6, 8, and 10-h.p. by other makers.

VERTICAL BOILER, 9 ft. by 3 ft. 6 in. with all fittings and mountings complete. Also one 8 ft. 6 in. by 3 ft. 6 in.
GAS ENGINE, by Crossley, 8-h.p. in first-class condition.
STEAM DERRICK, to lift 30 cwt. 45 ft. jib, nearly new.
6-ft. 7-ft. 6-in. and 8-ft. MORTAR MILLS.
TWO WOODFORD CENTRIFUGAL PUMPS.
TWO 4-in. CENTRIFUGAL PUMPS, by Gwynne.
ONE 8-in. DITTO.
ONE No. 5 PULSOMETER, with pipes and fittings.
ELEPHANT MOULDING, SHAPING, and RECESSING MACHINE, by A. Ransome & Co.
CIRCULAR SAW BENCH, rising spindle, for 26-inch saw, by A. Ransome & Co. Thorough order.
ONE Double-Cylinder WINDING ENGINE, by Chaplin.

The above, and a large stock of other engines and machines in first-class condition, are FOR HIRE or SALE cheap. Can be seen at LEWIS & LEWIS'S, Wandsworth Bridge Wharf, Fulham, London, S.W. Telegrams, "Lewises, London."

MACHINERY PURCHASED FOR CASH.

LOCOMOTIVE STEAM CRANES

IN STOCK,

READY FOR IMMEDIATE DELIVERY.

GRAFTONS, Vulcan Works, BEDFORD.

FOR SALE ON HIRE PURCHASE.—

Machinery of every description supplied on DEFERRED PAYMENTS or for Cash. New and second-hand. Write for circular. Inspect stock, especially Saw Benches, Band Saws, Lathes, Stone Breakers, &c. &c.—ROWLAND G. FOOT & CO. 12, Gt. Saint Thomas Apostle, London, E.C.

ENGINE (Willan's patent) FOR SALE,

cheap; also Twelve Phœnix ARC LAMPS, only been in use for short time.—W. 46, Powis-street, Woolwich, S.E.

FOR SALE, a Combined Vertical STEAM

ENGINE and BOILER, with 6-feet pan MORTAR MILL, on high travelling wheels; has shaft to drive saw, and all recent improvements. Also an 8-h.p. Second-hand PORTABLE STEAM ENGINE, with separate 6 feet MORTAR MILL.—Apply to

BARROWS & CO. LIM. { ENGINEERS, BANBURY, OXON.

STONEWORKING MACHINERY for all

purposes, of the latest construction.—For quotations address POWIS BALE & CO. Appold-street, London, E.C. Some second-hand Engines, Wood and Stoneworking Machines, in stock.

STONE BREAKERS, hand, horse, or steam

power, also MORTAR MILLS and CONCRETE MIXERS. A few second-hand ones that have been out, FOR SALE cheap. Also a BRICK BREAKING MACHINE, DISINTEGRATOR, and ENGINE let out on HIRE, with option of Purchase.—S. MASON & CO. Stone Breaking and Grinding Machine Manufacturers, LEICESTER.

FOR SALE or HIRE.—6-ft. and 7-ft. pan

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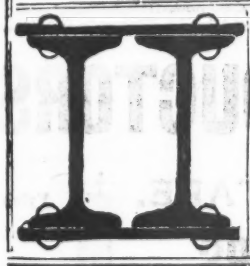

16″ × 6″ × 60lb.	10″ × 5″ × 35lb.	6″ × 5″ × 25lb.
15″ × 5″ × 50lb.	10″ × 4½″ × 32lb.	6″ × 3″ × 16½lb.
14″ × 6″ × 55lb.	9″ × 3¾″ × 24lb.	6″ × 2″ × 12½lb.
12″ × 6″ × 56lb.	8″ × 6″ × 39¼lb.	5″ × 5″ × 26lb.
12″ × 5″ × 44lb.	8″ × 5″ × 30lb.	5″ × 3″ × 15¼lb.
10″ × 6″ × 46lb.	8″ × 4″ × 24lb.	4″ × 3″ × 13lb.
	7″ × 3¾″ × 20lb.	

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12″ × 3″
10″ × 3″
9″ × 2½″
8″ × 3¼″
8″ × 2½″
6″ × 3″
6″ × 2½″

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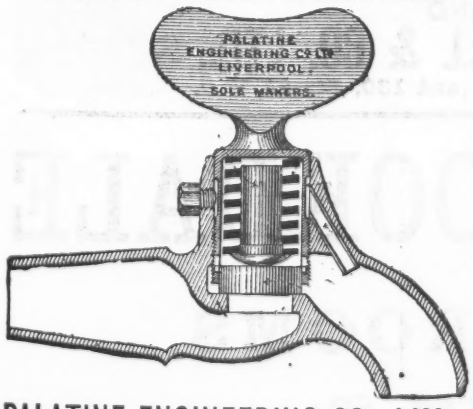

These taps have been opened and closed under water-pressure for the equivalent of more than 50 years (30 times a day) without any deterioration. The ordinary rubber, fibre, or leather washer valve, and the packing or washer round the spindle, are entirely dispensed with. Perfect water-tightness is nevertheless attained.

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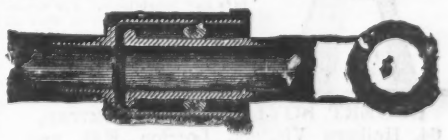

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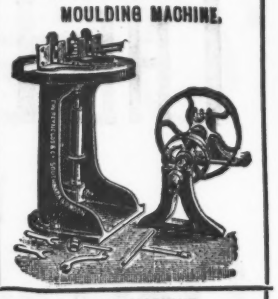

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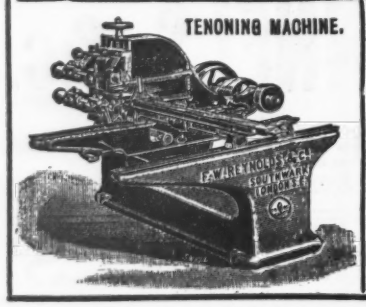

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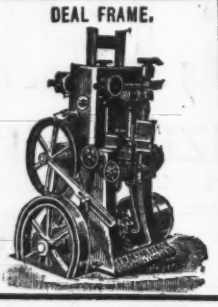

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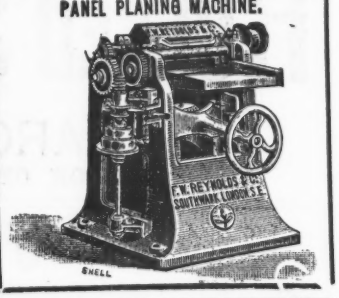

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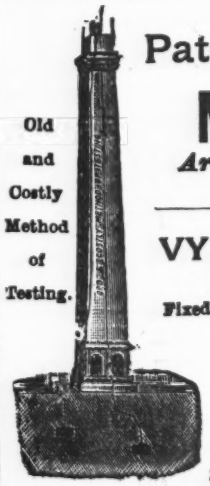

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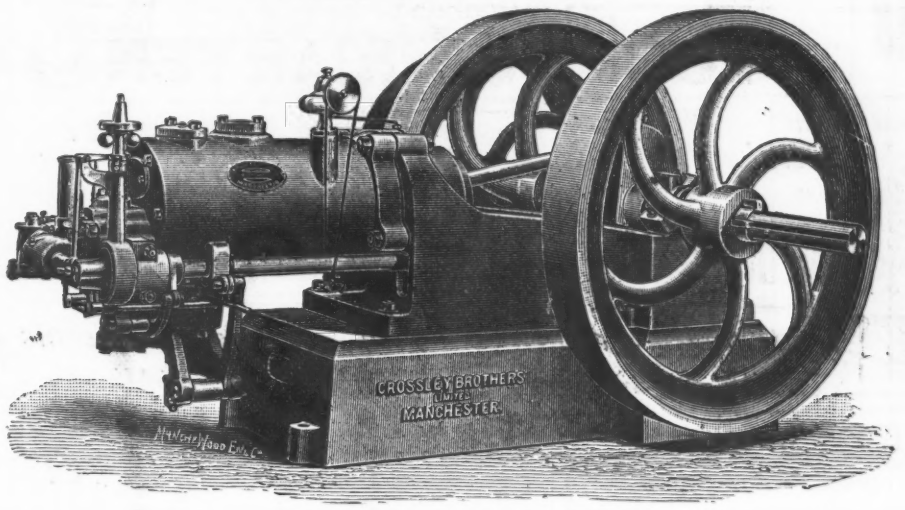

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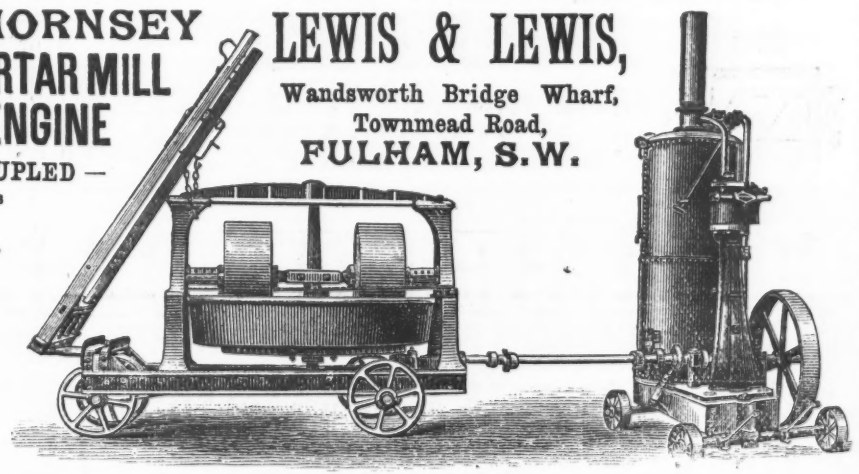

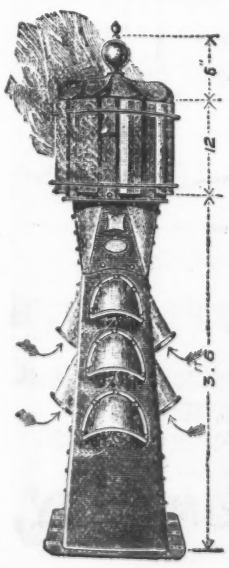

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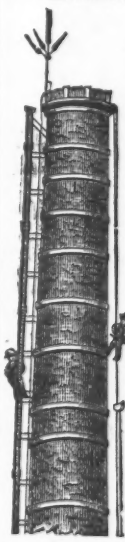

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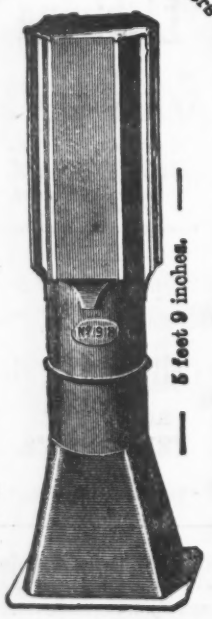

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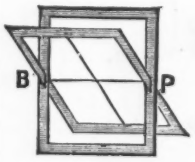

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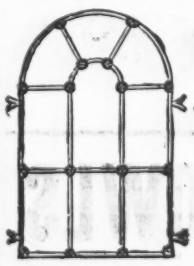

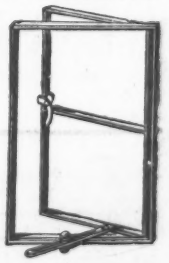

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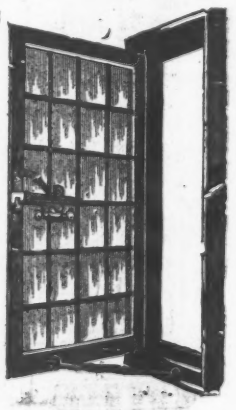

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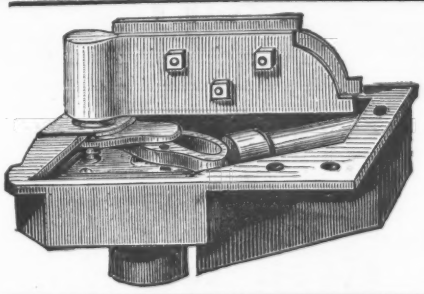

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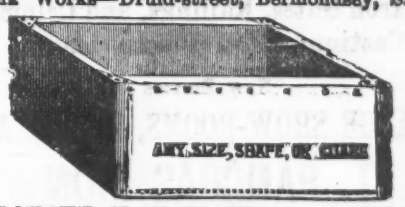

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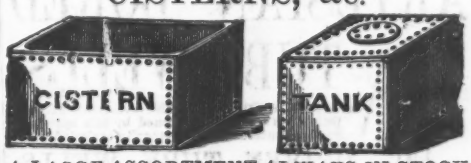

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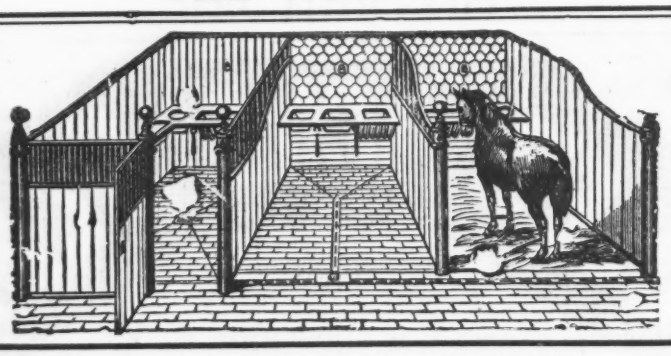

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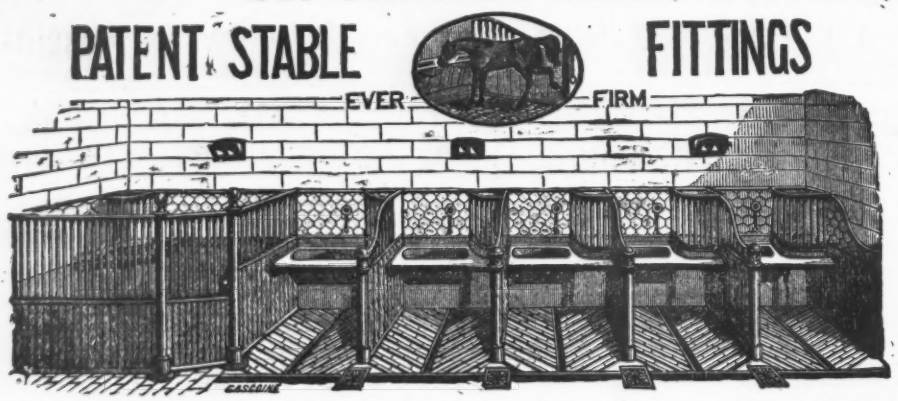

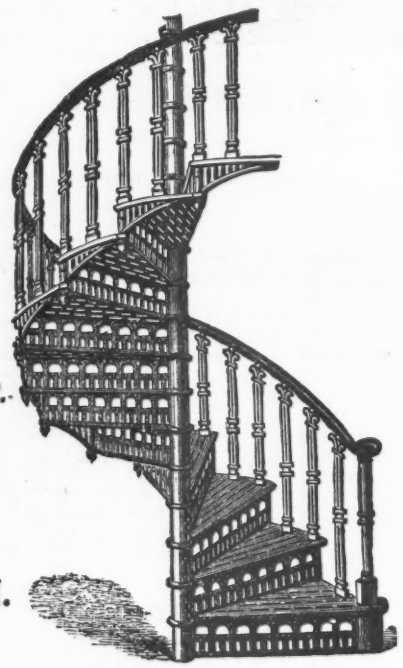

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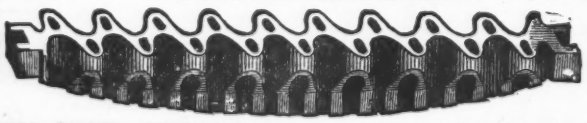

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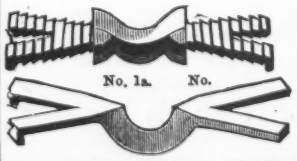

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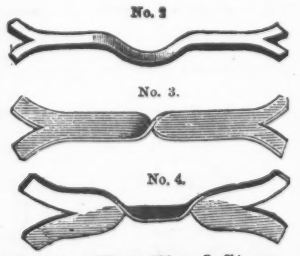

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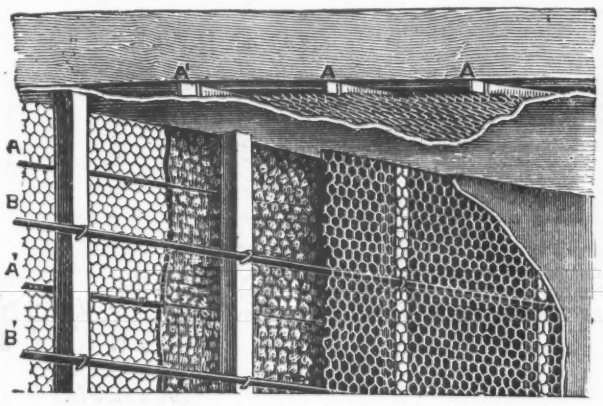

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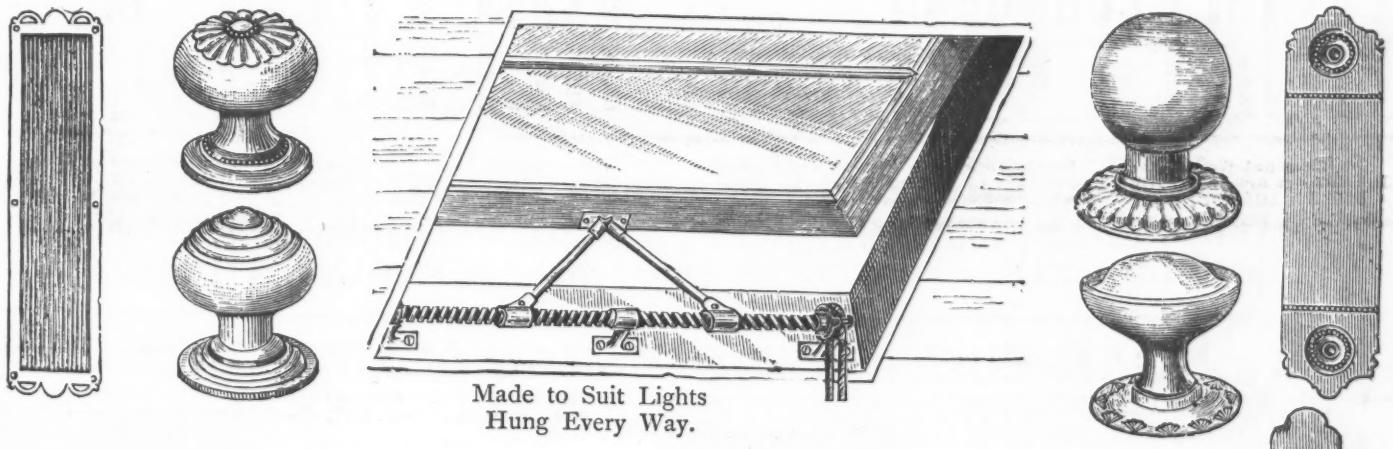

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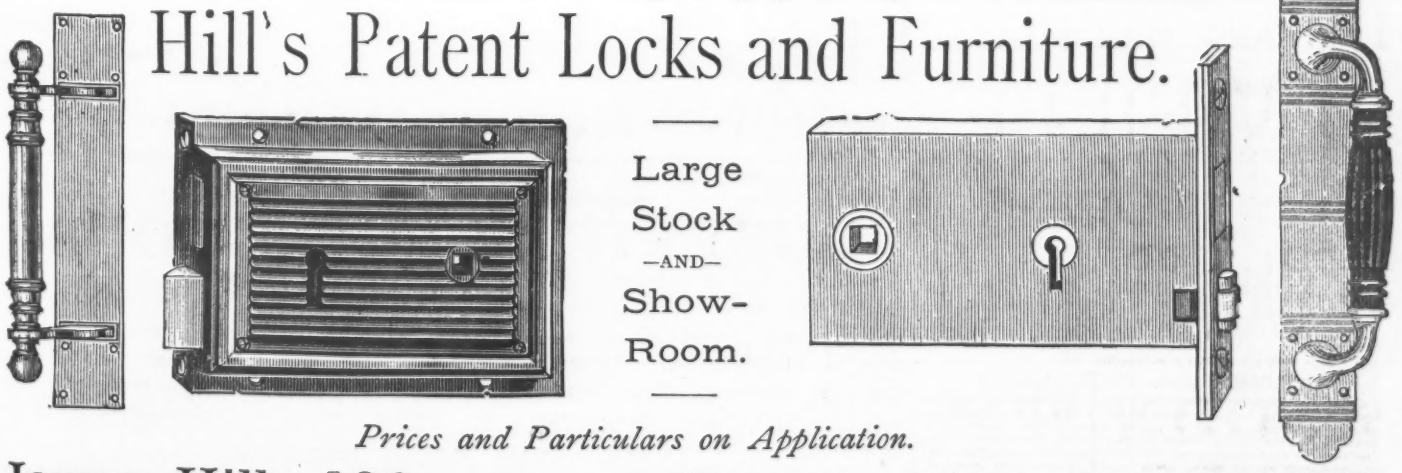

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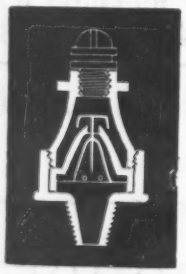

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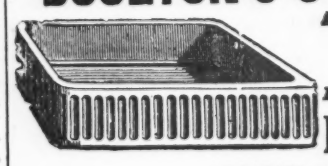
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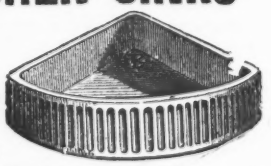
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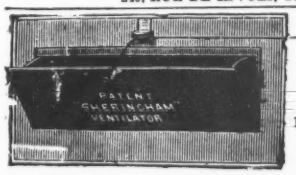

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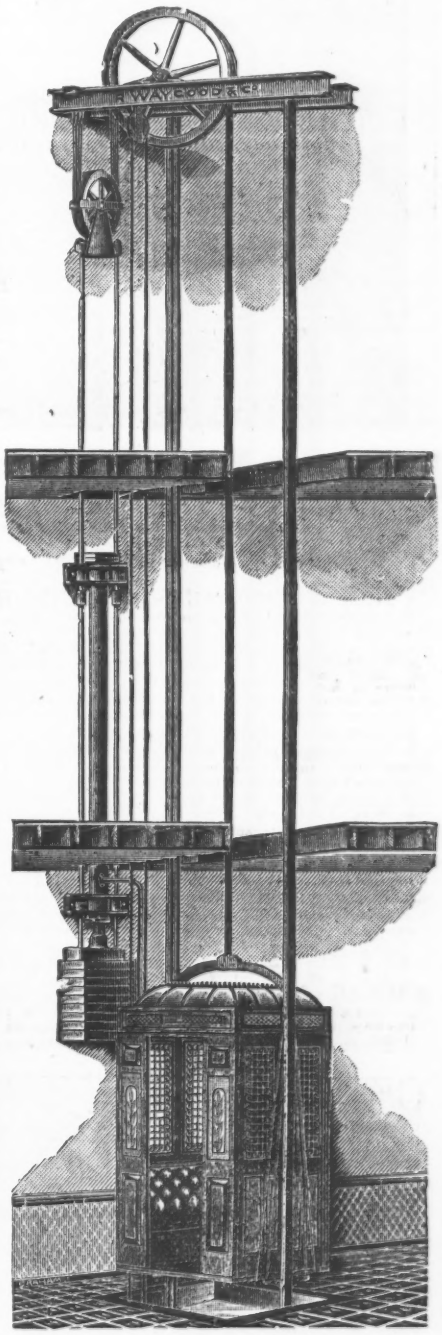

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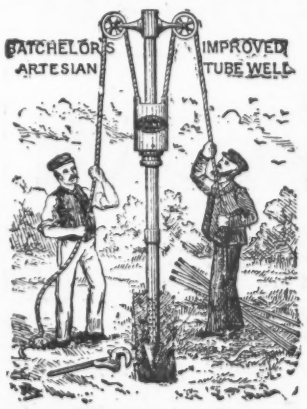

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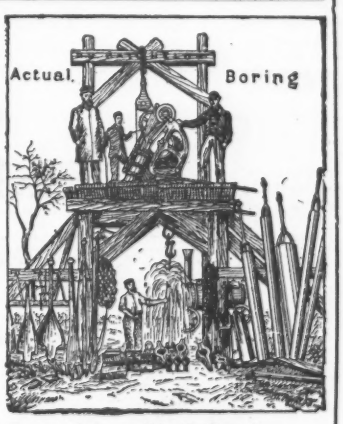

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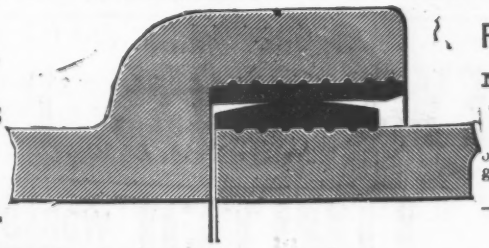

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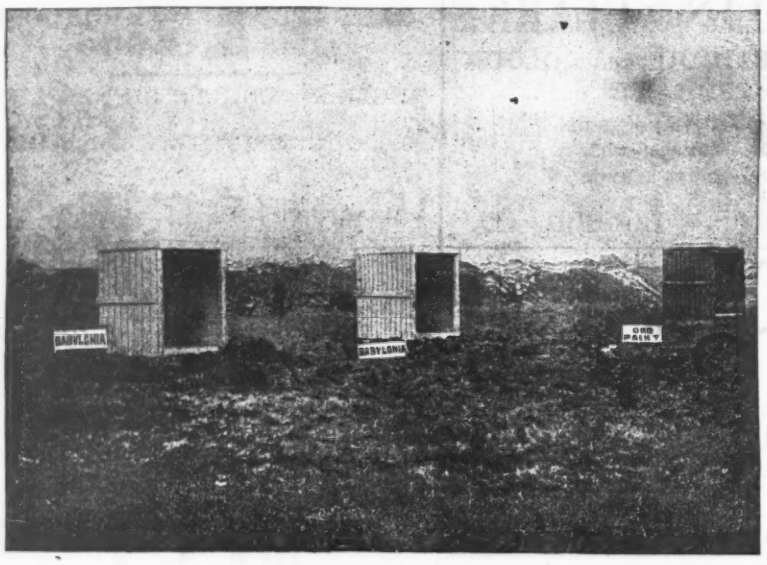

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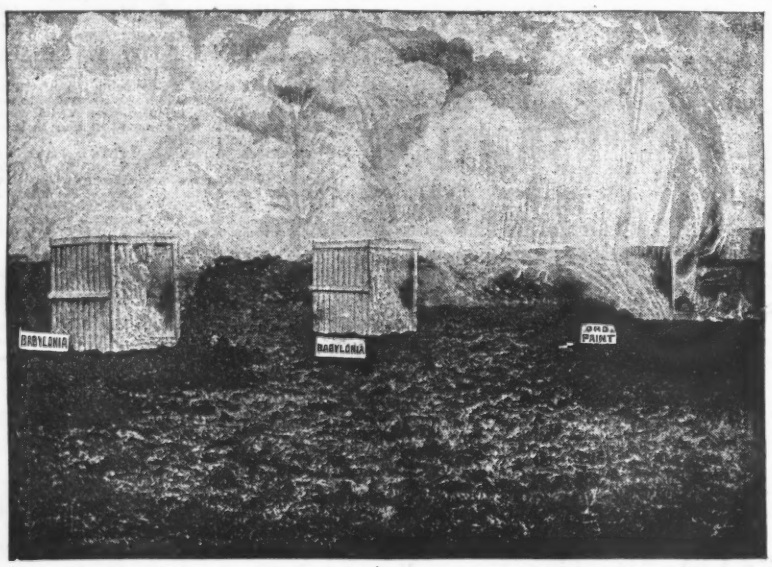

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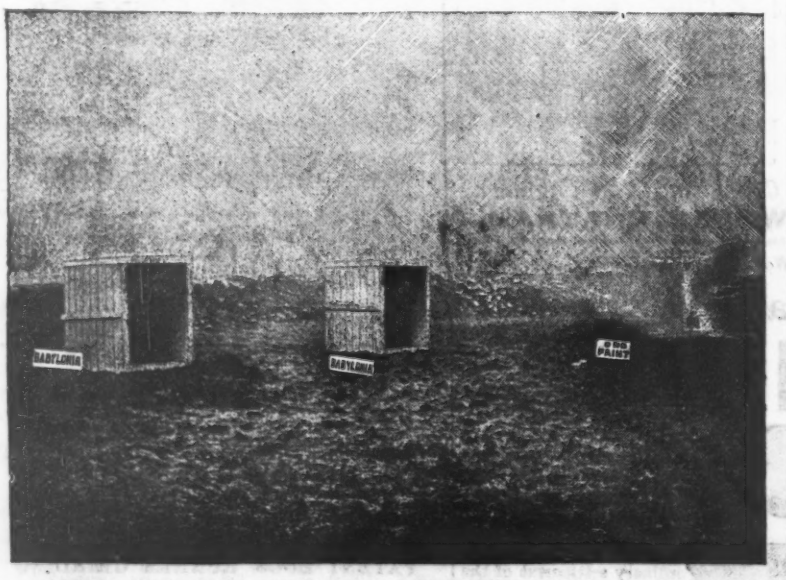

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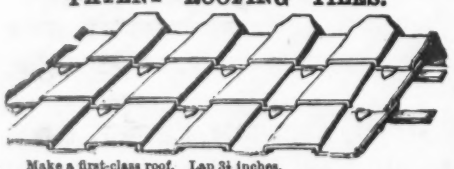

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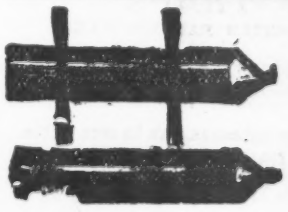

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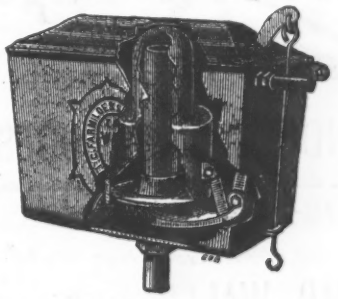

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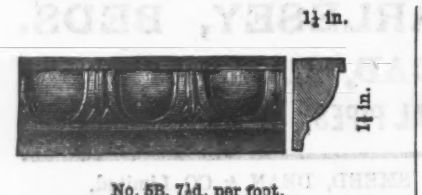

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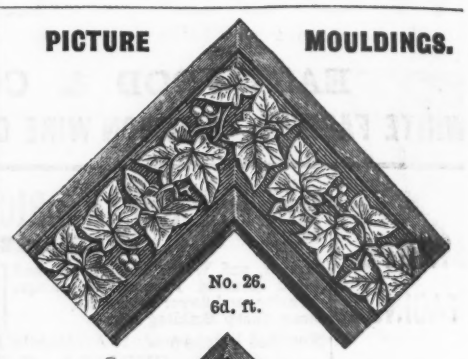

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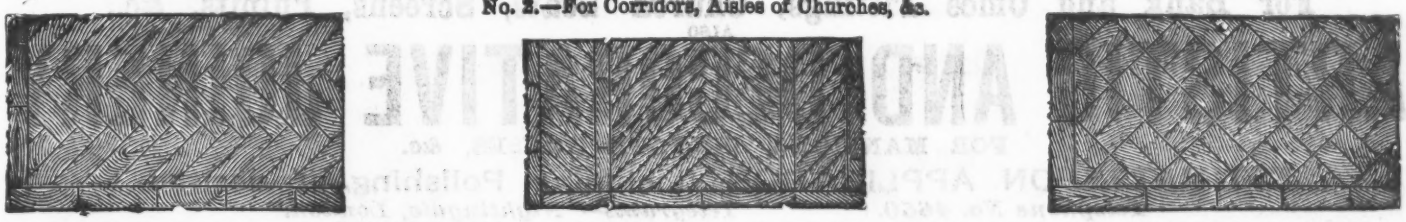

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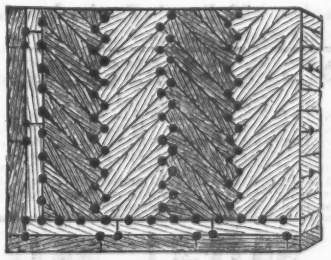

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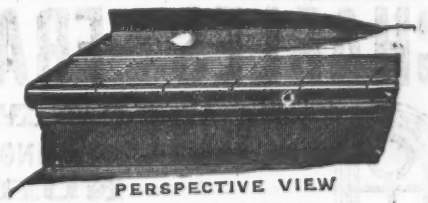

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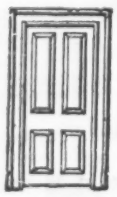

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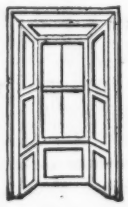

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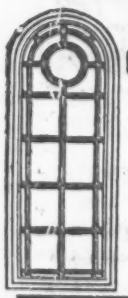

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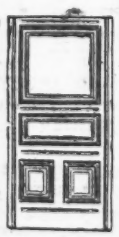

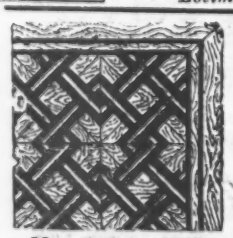

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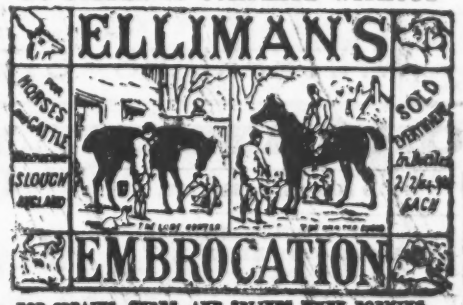

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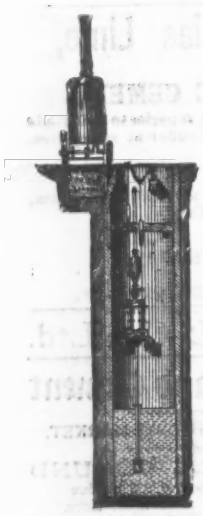

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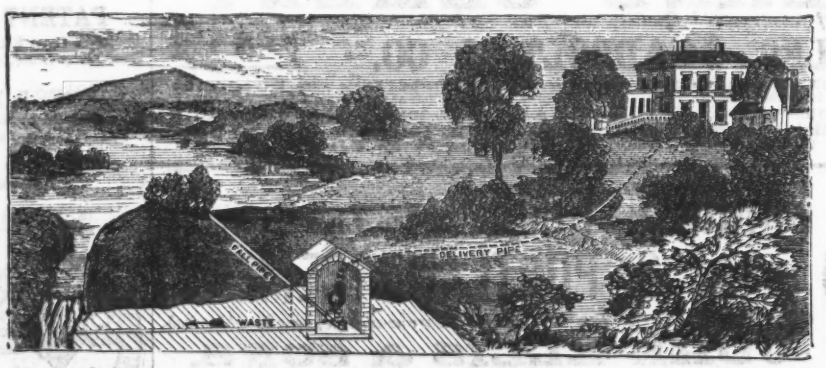

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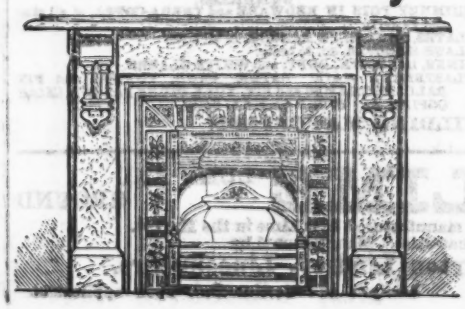

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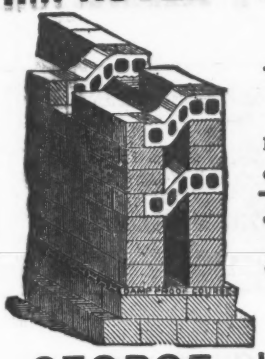

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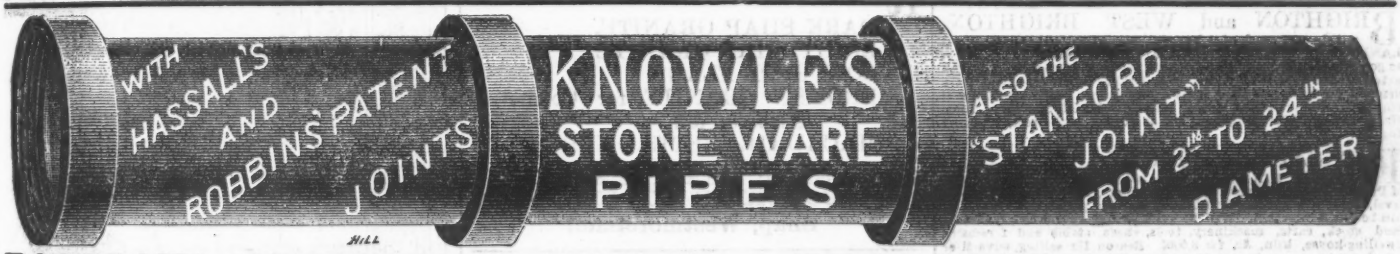

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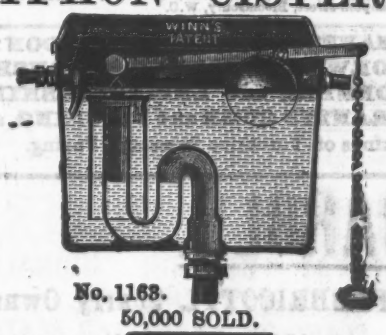

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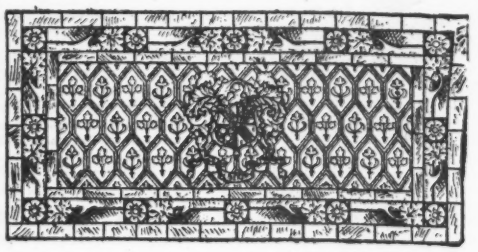

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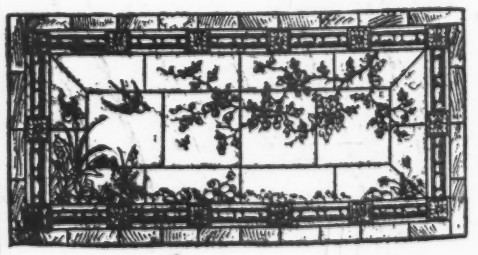

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Chappuis, P. H. & Co.

Refrigeration:—
Perkins, A. M. & Son. Ltd.

Rollers Pavement and Garden
Gilchrist, A.
Steven Bros. & Co.
Young & Marten

Roofs (Zinc and Cooper):—
Braby, F. & Co.
Hellitwell, T. W.
Holden & Co.
Treggon & Co.

Roofs and Buildings (Iron):—
Clark, Bunnett, & Co. Ltd.
Croggon & Co. Ltd.
Cutler, S. & Son.
Main, A. & J. & Co.
Marshall & Hatch.
Morton, F. & Co. Ltd.
St. Pancras Ironwork Co.
Treggon & Co.

Safes and Strong-room Doors
Chubb & Sons, Ltd.
Hobbs, Hart, & Co. Ltd.
Whitfield, F. & Co.

Sanitary Appliances:—
Adams & Co.
Andrew & Nanson
Ashton & Green Iron Co.
Baird, Thompson, & Co.
Brazier & Son
Bowes, Scott, & Western
Crapper, T. & Co.
Doulton & Co.
Farmiloe, G. & Sons
Farmiloe, T. & W.
Hayward Bros. & Eckstein
Jennings, G.
Pontifex & Wood, Ltd.
Reid & Co.
Sessions, J. & Sons
Shrewsbury, G.
Smeaton, J. Son, & Co.
Steven Bros. & Co.
Stiddes, J. G. & Co
Stiff, J. & Sons
Twyford, T. W.
Waller, G. & Co.
Winn, C. & Co.
Woodward & Rowley
Young & Marten

Sanitary Ware:—
Ashton & Green Iron Co.
Aylesford Pottery Co.
Cliff, J. & Sons
Crapper, T. & Co.
Dennis, Henry
Doulton & Co.
Farmiloe, G. & Sons
Farmiloe, T. & W.
Farnley Iron Co. Ltd.
Hartshill Brick & Tile Co.
Hawker, W. C.
Jennings, G.
Knowles, J. & Co.
Richardson, A. & W. T.
Rufford & Co.
Sessions J. & Sons
Shrewsbury, G.
Skey, G. & Co. Ltd
Smeaton, J. Son, & Co.
Smith, T. & Co.
stanley Bros.
Stiff, J. & Sons
Twyford, T. W.
Woodward & Rowley
Young & Marten

Scaffold Cord, Sash Lines, &c.:
Austin
Gourock Ropework Co.
Piggott Bros. & Co.
Potter, A.

Scagliola:—
Bellmau & Ivey
Plastic Decoration Co.
Regan, G.

Sewage and Water Systems
Hughes & Lancaster
Revolving Purifier Co. Ltd.

Shutters:—
Francis & Co.
Haskins, S. & Bros.
Hodkinson & Co. Ltd

Silicate Cotton:—
Jones, F. & Co.

Slates:—
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Cliff, J. & Sons
Coles, Shadbolt, & Co.
Hooper & Ashby.
Roberts, Adlard, & Co.
Rosher, F. & Co.
Richardson, A. & W. T.
Sessions, J. & Sons

Slate Enamellers:—
Ashton & Green Iron Co

Socket-Rings:—
Hancock, J. L.

Stable Fittings:—
Barton & Ballard
Bayliss, Jones, & Bayliss
Hayward Bros. & Eckstein
Marshall & Hatch
Musgrave & Co. Ltd.
St. Pancras Ironwork Co
Steven Bros. & Co.

Staircases, Verandahs, &c.
Clark, Bunnett, & Co.
Coalbrookdale Co. Ltd.
Hayward Bros. & Eckstein
Jones, J. G. & Co.
Lion Foundry Co.
Main, A. & J. & Co.
Marshall & Hatch
St. Pancras Ironwork Co.
Steven Bros. & Co.
Wright, G. & Co.

Stair Treads:—
Doulton & Co.
Mason & Co.

Steel Wire Rope:—
Bullivant & Co.

Stone:—
Bath Stone Firms Ltd.
Crew, J. & A.
Freeman, W. & J. R.
Braby, F. & Co.
Gething & Grice
Ham Hill Stone Co.
Lilly, T. P.
Lindley Quarries.
Nowell & Robson
Portland Stone Quarring, &c. Co
Trask, C. & Sons
Weldon Stone Quarries
Weston Quarries

Stone Breakers:—
Mason, S. & Co.

Stone Preservative:—
Bath Stone Firms, Ltd.
Szerelmey & Co

Stone, &c. Working Machinery
Coulter & Co.

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Ashton & Green Iron Co.
Ball, H. A.
Barnard, Bishop, & Barnards
Benham & Sons
Coalbrookdale Co. Ltd.
Constantine, J. & Son
Heim, H.
Jennings, G.
Musgrave & Co. Ltd.
Sessions, J. & Sons
Steel & Garland
Steven Bros. & Co.
Walker, W. & Sons
Wright, G. & Co.
Yates, Haywood, & Co
Young & Marten

Street Sweepers:—
Barrows & Co.

Structural Ironwork:—
Brush, Hiram, & Co.
Dennett & Ingle
Dorman, Long, & Co.
Dunkerley, G. C. & Co
Henderson & Glass
Homan & Rodgers
Leeds Steel Works, Ltd.
Lindsay, Neal & Co.
Measures Bros. & Co.
Moreland, R. & Sons
Rownson, Drew, & Co.
Shaw, M. T. & Co.
Steven Bros. & Co.
Williamson, J. & Co.

Tanks, Cisterns, &c.
Ashton & Green Iron Co.
Bellamy, J.
Braby, F. & Co.
Burney & Co.
Crapper, T. & Co.
Croggon & Co. Ltd.
Lindsay, Neal & Co.
London Galvanised Iron Co.
Treggon & Co.
Williamson, J. & Co.
Young & Marten

Tarpaulins:—
Gourock Ropework Co.
Piggott Bros. & Co.
Potter, A.

Tar Paving, Pitching, &c. —
Constable, W. E. & Co.
Hobman, A. C. W. & Co.

Terra Cotta:—
Bracknell Brick, &c. Co.
Cliff, J. & Sons
Dennis, Henry
Hamblet, J.
Jennings, G.
Skey, G. & Co. Ltd
Stanley Bros.
Stiff, J. & Sons

Tiles:—
Ashton & Green Iron Co.
Aylesford Pottery Co.
Benham & Sons
Bobbs, T. & R.
Bracknell Brick, &c. Co.
Broomhall Brick and Tile Co.
Carter, A. T. S.
Castle Fire Brick Co.
Dennis Henry
Godwin, W. & Sons
Hamblet, J.
Hartshill Brick and Tile Co.
Hawker, W. C.
Madeley Wood Co.
Maw & Co. Ld.
Mansfield Bros
Minton, Hollins, & Co.
Newton, J. & Sons
Richardson, A. & W. T.
Roshers Co.
South Staffs Brick Co.
Stanley Bros.
Webb's Worcester Tileries Co.
Woolliscroft, G. & Son.

Timber:—
Ashbee & Son
Forman, T.
Goodman, Hughes, & Co.
Hunter, W. & J. R.
Rowland Bros.
Sandell, H. & Sons
Sandell, J. & Co.
Sessions & Son.
Snewin, C. E. N.
Vigers Bros.

Traps (Cast Lead):—
Dent & Hellyer

Tree Guards (Iron):—
Bayliss, Jones, & Bayliss,

Turnstiles:—
Isler, C. & Co.

Underlining, &c.:—
McNeill, F. & Co.
Willesden Paper & Canvas Wks.

Ventilating:—
Baird, Thompson, & Co.
Blackman Ventilating Co. Ltd.
Boyle, R. & Son, Ltd.
Constantine, J. & Son
Fryer, J. D. & W.
Hart, Son, Peard, & Co.
Hayward Bros. & Eckstein
Hill, James
Kershaw, A. W. & Co.
King, J. Ltd.
Smeaton, J. Son & Co.
Sugg, W. & Co. Ltd.

Wall and Ceiling Coverings.
Anaglypta Co.
Jeffrey & Co.
Simpson, W. B. & Sons
Walton, F. & Co.
Woollams, W. & Co.

Wall Ties:—
Chambers & Co.
Cheadle & Co.
Mounery, W. & Co.

Water Taps:—
Palantine Engineering Co.

Waterproof Oil Sheets:—
Gourock Ropework Co.
Piggott Bros. & Co.
Potter, A.

Weather Bars:—
Elliott, S.
Stidder, J. G. & Co.

Windmills:—
Williams, Alfred & Co.

Window Frames and Sashes
Burt & Potts
General Iron Foundry Co. Ltd.
Hayward Bros. & Eckstein.
Hope, H.
Lindsay, Neal & Co.
Wenham & Waters, Ltd.

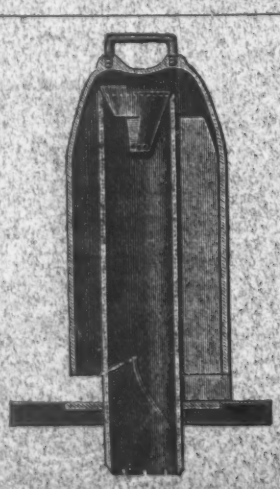
Wine Bins (Iron):—
Farrow & Jackson

Wire Fencing (Iron & Steel
Bayliss, Jones, & Bayliss

Wire Lathing:—
Johnson, Clapham, & Morr

Wood Flooring and Paving
Acme Wood Flooring Co.
Ashbee & Son
Gregory, T. & Co.
Improved Wood Pavement Co.
Lowe, Roger L.
Vigers Bros.
Westminster Patent Flooring Co.
Wood Block Flooring Co.

Wood Working Machinery—
Frost, R. G. & Co
Lewis & Lewis
Marshall, Sons, & Co. Ltd
Ransome, A. & Co.
Reynolds, F. W. & Co.



1889 PATENT.

ROGERS FIELD'S NEW "1889 PATENT"

SELF-ACTING SIPHON

FOR FLUSHING TOWN SEWERS AND HOUSE DRAINS.

This newly-invented Siphon of Mr. FIELD'S prevents Dangerous Deposits in Drains, and the liability to the evil effects of Sewer Gas, and is undoubtedly the most perfect one—both theoretically and practically—that has yet been made.

ROGERS FIELD'S PATENTS HAVE BEEN SUPPLIED TO

H.R.H. THE PRINCE OF WALES. | *H.R.H. THE DUKE OF CONNAUGHT.*
H.R.H. THE DUKE OF EDINBURGH | *H.R.H. THE DUCHESS OF ALBANY.*

AND HAVE OBTAINED THE **GOLD MEDAL** AT THE INTERNATIONAL HEALTH EXHIBITION, 1884.

FOR FURTHER PARTICULARS APPLY TO

BOWES SCOTT & WESTERN,

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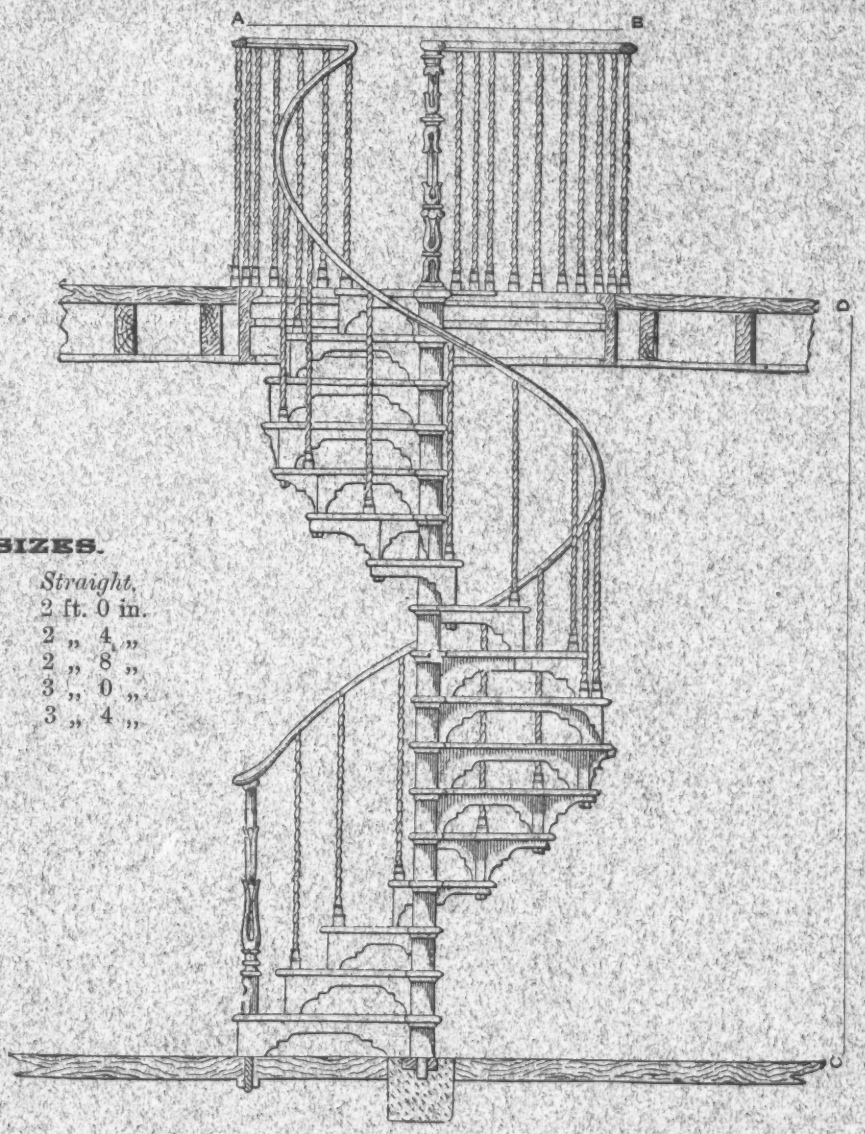
BROADWAY CHAMBERS, WESTMINSTER LONDON, S.W.

HAYWARD'S IMPROVED IRON STAIRCASES.

TREAD, RISER, AND SPANDRIL IN ONE.

Which gives much greater strength and stiffness than when the Treads are built up of three pieces.

Orders and **Inquiries** should state the outside diameter, A—B, and the height from floor to floor, C—D, and give a rough sketch of position of Staircase, showing convenient point for first step on ground floor and top landing, and whether Balusters and Hand-rail are required at top round Well-hole.



STOCK SIZES.

Circular.	*Straight.*
3 ft. 6 in. dia.	2 ft. 0 in.
4 „ 0 „ „	2 „ 4 „
4 „ 3 „ „	2 „ 8 „
4 „ 6 „ „	3 „ 0 „
5 „ 0 „ „	3 „ 4 „
5 „ 6 „ „	
„ „	

Staircases, Spiral and Straight, for Fire-Escapes, &c.

Estimates given for all kinds of Iron Staircases.

HAYWARD'S PATENT "SEMI-PRISM" PAVEMENT LIGHTS.
HAYWARD'S PATENT SAFETY COAL PLATES—SELF-FASTENING AND SELF-LOCKING.
HAYWARD'S VENTILATORS FOR ROOMS, SCHOOLS, PUBLIC BUILDINGS, &c.
STABLE FITTINGS (COTTAM'S), STALL DIVISIONS, LOOSE BOXES, &c.
SASHES, WROUGHT IRON, MACHINE-MADE, IRON DOORS, &c.

FOUNDRY WORK & GENERAL CASTINGS ON SHORTEST NOTICE.

Illustrated Catalogues and Estimates on application.

HAYWARD BROTHERS & ECKSTEIN,

ENGINEERS AND IRONFOUNDERS,

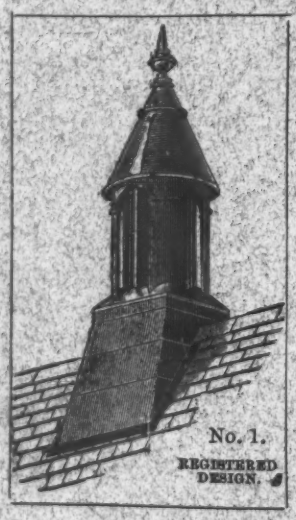
187, 189, 191, & 193, UNION STREET, BOROUGH, LONDON, S.E.

ROBERT BOYLE & SON'S

LATEST IMPROVED PATENT

Self-Acting Air-Pump VENTILATOR.

50 PER CENT. REDUCTION IN PRICE.



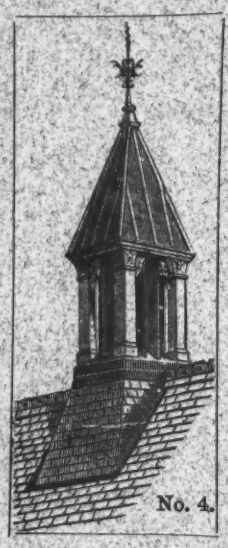
No. 1.
REGISTERED DESIGN.

The most Powerful Exhaust and

CHEAPEST VENTILATOR IN THE MARKET.

IMPERVIOUS TO WET AND DOWN-DRAUGHT.

Strongly made of the Best Steel, Galvanised, and Finest Workmanship.



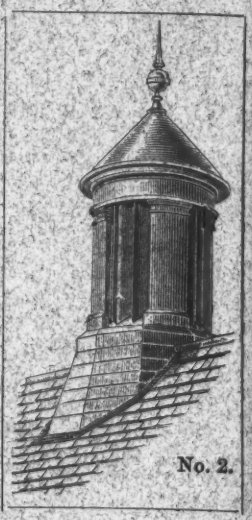
No. 4.

CAUTION TO ARCHITECTS.

FRAUDULENT SUBSTITUTION.

Having received complaints alleging the failure in certain cases of the Air-pump Ventilator, upon examination being made it was found in every instance that the contractor had substituted, to secure a greater profit to himself, a cheap and inferior ventilator resembling in outward appearance the Air-pump Ventilator, which had been specified to be used.

It is respectfully requested that in specifying the Ventilator the words "Robert Boyle & Son's latest improved Patent Self-acting Air-pump Ventilator" be used.



No. 2.

ROBERT BOYLE & SON'S

Latest Improved Patent

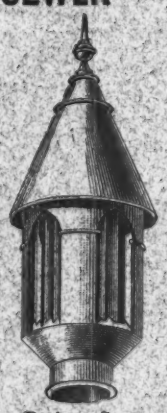
SOIL-PIPE DRAIN AND SEWER VENTILATORS.

The Cheapest and most efficient in the Market.

From 12s. each.

Approved of and used by Baldwin Latham, C.E., Bailey-Denton, C.E., W. Eassie, C.E., and by all the leading Architects, Sanitary Engineers, Builders, and Plumbers in the United Kingdom.

Soil-Pipe Ventilator.



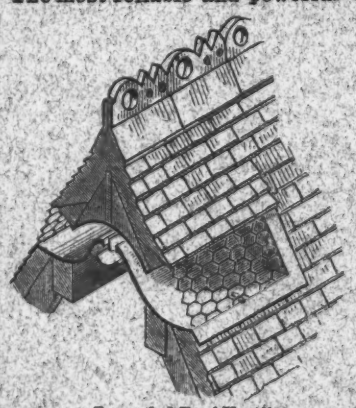
Drain or Sewer Ventilator.

ROBERT BOYLE & SON'S

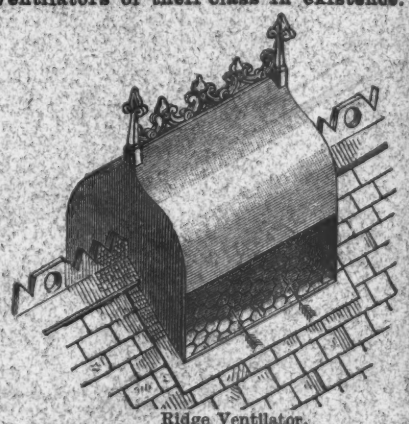
Latest Improved Patent

CONCEALED ROOF AND RIDGE VENTILATORS.

The most reliable and powerful Ventilators of their class in existence.



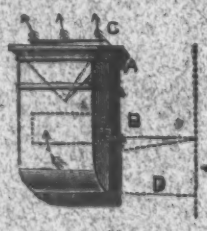
Concealed Roof Ventilator.



Ridge Ventilator.

Robert Boyle & Son's

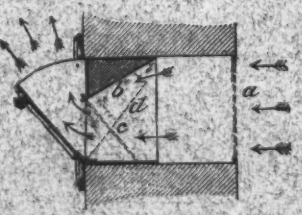
LATEST IMPROVED AIR-INLET BRACKETS AND WALL PANELS, *from* 10/- *each.*



Bracket No. 1A.

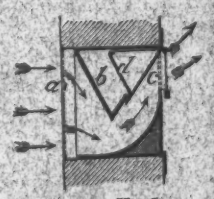
Bracket No. 2A.

Panel No. 2B.



Section No. 2B.

Panel No. 2C.



Section No. 2C.

N.B.—All the above Appliances are manufactured solely by us, and none are genuine unless they bear our

Registered Title and Trade Mark.

registered Title and Trade Mark, any infringement of which involves a penalty of two years' imprisonment.

ROBERT BOYLE & SON. LTD., 64, HOLBORN VIADUCT, LONDON; AND 110, BOTHWELL STREET, GLASGOW.

Catalogues, Price Lists, &c., sent Post Free on Application.

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2484